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All communications to be addressed:

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Congress.

Consequent upon conditions arising from the international situation, and in view of the abandonment of the Royal Agricultural and Horticultural Society's Spring Show this year, it has been decided that the Adelaide Congress of Branches of the Agricultural Bureau is to be abandoned for the present year.

Sore Shoulders.

The following points, dealing with the prevention and treatment of sore shoulders in horses, have been supplied by the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.):—

Causes-

The driver, loss of condition, state of collar.

Reasons-

Skin loses resilience when over tired.

Glands swell when not groomed, they are waste removers.

Prevention-

Keep up the condition.

Groom shoulders before and after work.

Have two collars where possible.

Beat out and clean collar at least once a week.

See that collar fits, bears equally on shoulder from withers to windpipe; fingers must have room under it all round, and hand pass freely between it and windpipe.

Draught on hames hook half-way up collar.

Short rests and often during work, especially in afternoon.

Treatment-

Clean sore, dress before work with liniment of 20zs, white lead to pint of neatsfoot oil, repeat midday and evening.

Chamber collar, or pad with stocking stuffed with horsehair, use bran bags.

Bad cases require spirit of iodine or tr. arnica in methylated spirit, 1-20. Lance swellings at back and bottom.

Cut out hardened glands from same position.

Work where possible, after removing bearing from actual sore.

A tablespoonful of sulphur in feed every day once for a week.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

STOCK INQUIRIES.

Replies by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"C.W.H.," Hackham, reports that he has twin heifers, 2 years old, which fail to breed.

Reply—Twin calves of the same sex may breed; those of opposite sexes (freemartins) will not. Frequently there is defective development of the sexual organs indistinguishable to the lay eye, and sex, though apparently female, is in reality not so. This is probably the case with the heifers in question, which would probably be more profitable to the butcher than the breeder.

"J.B.D.," Rudall, has a mare which has been stubbed in the frog.

Reply—Carbolic oil and Stockholm tar are correct treatment, but the wound has not had sufficient under drainage, and should be opened to let out the pus, and then soaked in hot water with a handful of washing soda in it. It may then be re-dressed, but a daily dressing of spirit of iodine will probably be best for it. The mare would do better in a paddock, and 4ozs. of Epsom salts may be given once a week with advantage.

"R.W.D.," Rockleigh, reports that a gelding jarred and bruised its shoulder whilst working in a harrow. The shoulder is now very hard, and a lump has appeared. He asks advice.

Reply—Spell, foment twice daily with very hot water, and rub in blue mercurial ointment after; this should reduce the lump in a fortnight; if it does not, the knife will have to be used. The incision should be behind the lump, and the fingers passed all round under the skin to break down adhesions; the inside should then be dressed daily with spirit of iodine. The horse should spell till harvest.

"W.S.N.," Yarcowie, reports the death of a 14-year-old mare, and details symptoms. *Post mortem*—The bowels were found to be badly inflamed, and contained a quantity of dark fluid, and large numbers of worms, half inch long; worms also in stomach.

Reply—Due to invasions of bloodworms, the small white ones in bowels were Sclerostomum tetracanthum, the larger ones Sclerostomum equinum, and those found in the stomach Habronema equi, with probably Spiroptera microstoma and Megalostoma, the former in the nodule. The bowel burst on account of gases given off by feed when it had been weakened by the passage of the worms through the coats of the bowel. Treatment was too late. A few weeks ago a course of Fowler's solution of arsenic would have done good.

"D.J.D., Long Plain, states that a mare galloped into wire, and cut her leg above the knee. The tendon sticks out, and does not seem painful, but the mare bites it.

Reply—Dress it daily with spirit of iodine (see Agricultural Journal), and put on plain bandage. As soon as healing has fairly set in smear equal parts of Stockholm tar and Venice turpentine on a bandage, and leave on for a week or two, then re-dress.

The same correspondent reports the death of a foal, 18 days old, from stoppage. There was bleeding from the navel, and then a watery discharge-from the same.

Reply—There was evidently congenital deformity of the navel, and probably also of the bowel, which brought about the stoppage, and it was as well that the foal died. In another similar case, it would be well to mix equal parts of spirit of iodine and Venice turpentine, and make a pad to stick on the navel.

"J.B.T.," Sutherlands, has a colt, nine months old, which is very weak, cannot get up, has a damaged eye, which has white skin over it.

Reply—Although valuable, it would probably be best to destroy the animal. If this course is not followed, give twice a day a dessertspoon of Fowler's solution of arsenic and a flat teaspoon of sulphate of quinine, both mixed with a spoon of molasses, and smeared on tongue or teeth. Bathe the eye daily with warm water, in which a pinch of boracic acid has been dissolved. The outlook is not hopeful; bloodworms are the trouble.

"J.H.H.," Crystal Brook, asks for treatment for lousy horses.

Reply—Stand the horses in hot sun, and wash them with soft soap. Leave the lather on to dry; half a teacup of fluid sheep dip may be added to the water if desired. After an hour or two, wash this off with warm water and soda, and when dry, wipe over with one part benzine and five parts olive oil. This may be applied freely where the lice are most numerous, but should only be lightly wiped over the rest of the This must be repeated in a week for a time or two, as the nits keep on hatching out. If a spray is desired, any fluid sheep dip mixed as directed on the tin will do, or benzine from one of the cheap benzine sprays; but do not spray all the body with this at one time, as it is very irritating owing to the rapid evaporation. The washing can be done with an ordinary yard brush or besom, as the expense of material The workers' harness can be cleared with boiling water and As the horses improve in condition the pest will harness oil after. A tablespoon of sulphur in a little chaff daily for a fortnight lessen. will also help.

The Port Elliot Branch of the Agricultural Bureau report that a number of cows in the district have lost the use of their hindquarters; and inquire the cause.

Reply—The trouble is probably due to eating yacca shoots. Try twice daily in feed for a week or so a powder made of one teaspoonful each of sulphate of iron, powdered nux vomica, sulphur, powdered liquorice. Rub liniment into loins; for prescription, see Agricultural Journal, "Medicine Shelf."

The Hartley Branch of the Agricultural Bureau ask for a cure for sand in cows and sheep.

Reply—There are greater anatomical difficulties in shifting sand out of ruminants, but the following mixture is often found successful:—Molasses 2lbs., tineture ginger 30 drops, essence peppermint 30 drops, pollard gruel 1 pint. Repeat two or three times if necessary at three-day intervals; one-quarter dose for full-grown sheep, one-eighth for hogget.

"B. Bros.," Koolunga, have a colt with ulceration of the eye (cornea). They bathed the affected part with boracic acid, and then with salt and water; also put white vitriol solution in the eye, which appeared as though it had been stabbed.

Reply—Treatment so far has been right. It will take months to clear, and probably never will where the puncture is, but if this is in the centre of the eye, it will not materially interfere with sight. Once or twice a week blow in a small pinch of dry boracic acid powder, and

await results; hurrying will do no good. Do not be inveigled into trying sugar, powdered glass, and things like that, that people recommend for colts that are not their own.

Mallala Agricultural Bureau ask (a) should a cow be drenched through the nose or through the mouth; and (b) the correct spot to stab a blown cow.

Reply—No animal should be drenched through the nose, the effect is the same as if one tried to take a drink that way. The nasal organ is not intended to be played upon so, it is intended for air only. The place to stab a cow is the highest point of the swelling on the left side. This is supposed to be a span from the haunch bone, backbone, and last rib respectively; it is the middle of the V apparent when the flank is hollow. A stick similar to a piece of broomstem tied across the mouth by a string round the horns, will cause belching, and often relieve the cow; thus saving the necessity for resorting to stabbing.

Hammond Agricultural Bureau asks whether the feeding of molasses cause worms in horses.

Reply—Yes, by attracting flies, which are the carriers of a very troublesome worm affecting horses' stomachs. No, because all worms have to come from worm parents, but the laxative effects of molasses frequently cause them to be passed. Molasses as a condiment is useful; as a feed is very poor stuff.

"J.D.H., Nhill, Victoria, has a light horse with chronic foul smelling discharge from right nostril, little blood; easily knocked up. Was once chilled after a hard drive.

Reply—The symptoms are those of an abscess somewhere in the breathing tract, and probably difficult to get at, as most likely in the sinuses of the head. Try plugging the nostril with absorbent cotton wool upon which 10 to 15 drops of eucalyptus oil are put; this may be done daily. Also give twice daily on the tongue 10 drops of tineture Hydrastis Canadensis for a fortnight or so. It is probable surgical aid is needed. The condition is spoken of as Ozaena.

"W.H.B.," Wynarka, has a horse with a very bad cut just below the hock.

Reply—From your description the cut is not very hopeful, still Nature does a great deal. Dress the wound once a day with spirit of iodine—one dram iodine, or as much as will lie on a shilling to a pint of methylated spirit or benzine. Never mind the proud flesh till the wound is well on the way to heal, and then cauterise it with hot iron or bluestone, and keep pressure on it with a bandage, but not till the wound is closed. You should be able to judge after a fortnight's treatment whether it will be worth while persevering.

"H.H.O.," Streaky Bay, has a six-months-old colt, stiff in hind-quarters, with swollen sheath.

Reply--Probably bloodworms. Give two teaspoons of Fowler's solution of arsenic once a day in feed for a fortnight, and then drench with a quarter of pint castor oil in a little warm milk.

"J.H.,"—Cowell, reports the dilatation of the pupil of the eye and blue clouding froth at the mouth of some of his horses. They are short-winded, rough-coated; rub their tails, and red spees are noticeable in the dung.

Reply—The last symptoms are those of bloodworms, and the specs are not eggs, which are quite microscopic, but they are probably little hamorrhagic spots caused by the worms. The eye symptoms are also sometimes caused by poisons secreted by the worms, at other times by plants such as yacca or spurious cress; there seems to be a likelihood of something of the kind here. There is no antagonism between work and Fowler's solution of arsenic, and horses may be worked during its administration. Try 10 drops of tincture belladonna morning and evening on the tongue for a week for the eye trouble. Give a teaspoonful of sulphate of quinine once a day in the feed, as well as the arsenic. Local treatment to the eyes will not do any good.

"P.H.K.," Penola, reports a draught mare as always rubbing herself, and biting her legs. The animal is in good condition.

Reply—Result of irritating parasites; give a tablespoon of sulphur in food daily for a fortnight, and dress the legs every evening with a mixture of benzine one part, olive oil five parts.

"E.R.M.," Moorlands, has a nine-year-old gelding which breathes heavily, and whose flanks fall in quickly after exhaling. This condition has been in evidence for two years; during last 12 months the beast has had a slight cough.

Reply—As the affection is of two years' standing, it is most probably broken wind or asthma, and is incurable. The symptoms, however, may be modified by feeding on green food and oats only, and giving 10 drops of tineture aconite on the tongue once a day for one week in each four.

"F.L.R.," Cooke's Plains, had a horse which for several weeks was rough-coated. It was drenched for worms with oil and turpentine. Eight hours after went off feed, and breathed short; then drenched for sand, again drenched with soda, grew worse; would not eat. When it tried to drink it could not swallow; died four days later.

Reply-The animal was drenched to death. Although the symptoms and treatment are candidly given, there is a suppression of cer-

tain apparently unimportant facts, namely, that the beast had its head up as high as it would go, and wasn't at all willing to take the first drench. P.M.—A bucketful of sand in the stomach, which milk and honey, repeatedly advised, would have begun to shift if it had preceded the oil and turps that prevented the action. The lump on the stomach was an abscess, due to habronema equi, frequently referred to in replies, which improves under daily doses of baking soda. His lungs were affected, and contained a lot of yellow fluid; this was the direct result of turpentine and oil that went down the windpipe.

"J.B.," Milang, had a mare which was found lying in paddock with front legs out, as if trying to get up, scouring badly, and passing large numbers of very small worms, and much sand; improved under nux vomica, but next morning was found to have passed a large quantity of blood. Lips, &c., very white; died next day. P.M.—Much blood in rectum, worms and sand in bowel, which was covered with cysts, and very thin where sand lay. Lump of matter in stomach.

Reply—The attitude was due to the pain of the intestinal obstruction being just below the stomach, and near the painful worm abscess mentioned. The worms and cysts were *sclerostomata* bloodworms. The blood was due to rupture of an intestinal artery damaged by them. The whole description is that of a very observant inquirer. After the rupture nothing could be done.

"S.A.J.," Caltowie, has a cow swollen as if blown, which belches wind when moved.

Reply—Tympanitis, due to rapid growing feed. It would be well to put a round stick in her mouth like a bit, tied round her horns and move her about briskly when very full. Drench her once a day for a few days with 3ozs. of hyposulphite of soda in a pint of warm water. Afterwards put on her tongue twice a day 20 drops of tineture nux vomica.

Pine Forest Agricultural Bureau reports that a cow belonging to a member appeared to be blown, and asks whether prickly jacks would cause the trouble.

Reply—Yes, prickly jacks and other quick-grown fodder produce the symptoms. Drench daily for a few days with 3ozs. hyposulphite of soda in a pint of warm water, tie round stick in mouth like bit; afterwards put on tongue twice daily 20 drops tincture nux vomica.

Spalding Branch of the Agricultural Bureau asks whether bunt in hay, in plentiful quantities, was injurious to horses, and whether small quantities had any tonic properties. Reply—Bunt, when plentiful, causes digestive trouble in horses through over stimulation of the liver. It has no tonic qualities when present in small quantities, but as it stimulates the liver, some horses appear to be benefited by it for a time.

"A.D.," World's End Creek, has a colt, rising three years, which shed its first two middle teeth about two months ago. A lump has formed between the nostril and the eye on the side of the head.

Reply—The lump is probably due to a bone disease called Osteomalacia, and is indirectly connected with dentition at three years. Probably it cannot be removed, but one could try rubbing in blue mercurial ointment every day for a fortnight or so, and giving mixed with chaff twice daily for the same period a wineglassful of syrup of phosphate of iron.

"W.F.H.," Cleve, has a cow which became stiff on several occasions, but a month ago became chronically so. The animal swelled from the jaw to the udder.

Reply--Probably bowels are irregular, too, though not stated; the symptoms are those of *Traumatic pericarditis*, which means that some substance has penetrated from the honeycomb paunch through the skirt, and set up inflammation in the heart bag. Treatment would not be satisfactory; slaughter would be more profitable.

"D.II.," Verran Siding, has a horse with a lump caused by faulty saddle, which rises at times, and seems to contain pus.

Reply—It is not stated whether the rising is under the seat or front arch of the tree. In the latter case it would be a fistulous wither; in the former a sit fast. In either case the knife must be used till the dead tissue is found and removed, then spray daily with benzine, and end by dressing with iodine, a drachm, to benzine 1 pint. Probably without veterinary aid the treatment will not prove successful.

"P.A.," Halbury, reports an eight-year-old mare as having a fleshy irregular growth with a discharge of thickish yellow matter.

Reply—This can be removed surgically, but cannot be cured otherwise. As it is possibly cancerous in nature, it is necessary for you to report it to the Chief Inspector of Stock, Adelaide.

"G.C.," Melrose, reports the death of a colt rising four years old. The animal had done no work for four weeks, until day before death. It had been feeding on bushy tufty grass, but on day of death was changed to a paddock containing large dandelions. The animal was much swollen, and its bowel protruded.

Reply—Flatulent colic. The swelling and protrusion of bowel were both due to the rapid evolution of gas, resulting from the double change of work and feed. The yellowish lumps were worm cysts. The long worms affect most horses. The worms were in the cysts, hence your failure to find the adults. In similar case give stimulants, especially peppermint 30 drops of essence, 2oz. doses of hyposulphite of soda, and empty hind bowel by hand, and rub flanks and belly vigorously.

"J.L.A.," Carey's Gully, asks (a) a cure for white worms 4in. to 6in. long, affecting horses; (b) does feeding on cut green feed, such as rye and barley, tend to cause worms in horses; (c) a means of inducing a cow which has been in milk for two years to breed.

Replies—(a) A good dose of physic, such as a pint of raw linseed oil and two tablespoons of turpentine will shift the worms; or, if preferred, a mixture of a quart of warm milk and two tablespoons of turps may be given as an injection. (b) The green feed mentioned does not cause worms, which are already in the horse's bowels, and the feed causes them to leave; it is the best worm medicine known. (c) Various causes may make this cow disinclined to take the bull. Probably she would if she were running with other cattle, now there is a flush of green feed. Medicines are not much good in such a case, though a tablespoon of red pepper every day in feed might induce the condition.

"M.L.H.," Naturi, asks for (a) tonic for horses weak after sand, and (b) treatment for horses affected with colic.

Reply—(a) Nux vomica, as you suggest, will be the best treatment, 10 drops twice a day for a fortnight or so. See also Journal of May for tonic powders. (b) 35 drops of chlorodyne is a small dose for a horse which, in a bad case, would want a large bottleful. A cheaper veterinary form is available, both in liquid or electuary form—the latter is preferable, as it is simply smeared on the teeth. For details of treatment see article by writer in the Agricultural Journal, "The Horse—Digestive Troubles."

"A.H.P.," Petina, has a mare with a growth on the eye; red and raw. He asks if there is danger of conveyance to either man or horses, and can the mare be cured by surgical treatment.

Reply—As the growth has increased so rapidly, it will be better to destroy the mare; the only alternative would be to remove the eye, and reference to the case shows that the trouble is so deep-seated that it would only be a temporary measure. There is no risk to attendant or of conveyance to other horses unless flies are still about, in which case there is a little risk for horses.

"W.W.," Salisbury, has a five-year-old mare which slobbers and loses flesh.

Reply—The teeth must be inspected, as it is probable there is something wrong with them. It would be well to take her to a qualified veterinary surgeon in Adelaide, and have her seen to.

"I. S.," Moorlands, has two mares, four years and 12 years old, which, on getting down, are unable to rise, and have passed much sand.

Reply.—The paralysis is probably dietetic, combined with worm mischief. Now green feed is available, give it, and once a day give, in a little bran, two tablespoonfuls of Fowler's solution of arsenic; twice a day, in a little molasses, on the teeth, a teaspoonful of sulphate of quinine. A little yeast mixed with the feed also daily will help. If slinging, do not raise off feet, and let out of slings every day.

"(4.11.M.," Mannum, has a nine-year-old gelding affected with paralysis.

Reply.—The trouble, as you imagine, is due to bloodworms, and the arsenic and quinine treatment should result in improvement. The sand is only secondary to the paralysed action of the bowels, and will gradually be got rid of. Liniment rubbed into the back will help.

"E.M.W.," Yallunda Flat, seeks direction for fattening a draught stallion for travelling or sale.

Reply.—See answer to "F.H.," Strathalbyn. A stallion at stud should not be fat, he should be hard. To try and fatten him quickly for sale will very likely end in a dead horse, as no horse, and much less a stallion, can stand a sudden change of diet, especially to a rich one such as required. Commencing gradually, and using care, the following would be a blubber-making ration:—Wheaten chaff, 30lbs.; long hay, 10lbs.; eracked maize, 5lbs.; boiled barley, 5lbs.; bran, 3lbs.; oats, 4lbs.; boiled linseed ‡lb.; or linseed cake, ‡lb. This would be a daily ration, and exercise would have to be given. The ration would be better given in four feeds, with the long hay available by day and night. Do not neglect a plentiful application of elbow grease if a fine coat is desired.

"F.," Kangaroo Island, has a horse with a lump as large as half a goose egg, apparently containing fluid, and over a month old, on the shoulder, about 3in. above the point.

Reply.—There is fluid in it, but by this time it is beginning to organise into fibre. Lance boldly at back of swelling at bottom, clean out contents with finger, swab out with iodine spirit, and dress daily with this. Having made the opening behind, the horse is better kept at work, as the pressure of the collar will help to clear out fresh fluid that may form.

"A.B.," Spalding, reports the death of a cow, which was stiff, unable to move, would kneel on one leg and stretch out correspond-

ing hind, moan, and then died. Paunch full of green feed and water. Rest of organs apparently healthy.

Reply.—Lush green feed wet produces on fermenting in paunch certain poisons called glucosides, which produce the symptoms. Prevention.—Do not let cows on such feed unless stomach is full of straw or similar substance, to prevent gorging. Treatment.—Stab, give milk and molasses. See more detailed reply to "Willaloo," p. 1068, July issue.

"H.F.K.," Peake, reports that his horses rub themselves and stamp their feet, and appear restless.

Reply.—The cause is most probably a form of mange, which chiefly attacks the legs. Give a flat tablespoon of sulphur in the feed once a day for two or three weeks. When legs are dry after work apply a little of this mixture every evening—Benzine, 1 part; olive or raw linseed oil, 5 parts.

"J.S.," Cradock, reports the occurrence of a complaint amongst sheep. The animals stand dull; when driven stagger and fall; after a short rest get up and proceed again; then stagger, tremble, lie down, and die.

Reply—The symptoms are those of two classes of disease common in South Australia. One, braxoid in nature, is caused by a bacillus; the other by a microscopic animal parasite, which is probably the cause in this instance. As no p.m. symptoms are given, the Veterinary Lecturer would be obliged if the Branch would send him a pickle bottle of a dying sheep's dung, the gullets of two or three dead sheep from throat to paunch, and the guts as they leave the stomach, about 6in. of stomach and gut combined. The best way to send is to put them in rags dipped in methylated spirit in an airtight tin. Prevention—Never let the sheep bite down tight, and shift from paddock to paddock every three days, allowing at least a week to elapse before they come on to a paddock again. Treatment—Cut the eye vein and give Cooper's worm tablets when the sheep are noticed dull.

"F.R.F.," Penola, reports that the teat of a heifer lately calved is blocked by a fibrous-looking substance.

Reply—Inflammation of teat duct. Rub well two or three times a day with hot soapsuds, and, if possessed of a syringe and teat syphon, inject twice a day after milking, for a few days, half a teacup of warm water in which a pinch of boracic acid has been dissolved.

"A.T.," Cleve, reports that an eight-year-old mare a few days after foaling went off feed; two days later was much worse; breathing hard and heavy; received dose for sand; got worse; kept on

lying down and getting up; seemed stiff, could not walk. *Post mortem*—Worms in bowels and something like a plum pudding, yellow and red, was found inside.

Reply-The worms had nothing to do with the case; they were the large bloodworms, Schrostoma equinum. Horses do not taste antimony tartrate in food; it is often given for these worms. trouble was metritis, or inflammation of the womb, and the vellow concern was probably a mass of uterine catarrh, possibly connected with a rupture of the organ, in which case nothing would have saved the mare. The stiffness was metastatic laminitis, or foundering, following the acute inflammation. Treatment would have been to thoroughly wash out the womb with pink Condy, and to give alternately three times a day 10 drops of tr. aconite and 10 drops tr. pulsatilla, till the symptoms had abated. The same correspondent also states that a six-year-old mare did not clean for more than 12 hours after foaling. then swelled under flank and belly; is sore when the foal sucks or she moves quickly; urine runs away. Reply—A mare should not go more than three hours without cleaning. If she does, look at the part hanging out; take the inner dark string between a split stick and wind, clearing the outer thicker whitish part free of the stick; all at once it will disappear inside; keep on winding, and the whole lot will come away; then swab out with Condy or washing soda, and give aconite and pulsatilla for a few days. In this case probably a teaspoon of saltpetre twice a day for three days will help the swelling and soreness to disappear; it may be given in feed or drinking water.

Leighton Agricultural Bureau reports that a member has horses which stamp their hind feet in a vicious manner. This ceased for a while, but has recommended.

Reply—The stamping is due to microscopic parasites known as acaris chorioptes. The fresh outbreak is due to fresh broods hatching out. Dress the legs every evening with a mixture of one part benzine and five parts olive oil; after they seem to have recovered apply the dressing once a week for a few weeks to catch stragglers. Also for a week or ten days give a tablespoon of sulphur in the food once a day.

"M.H.B.," Mangalo, has a gelding, rising four years, which last year was affected with strangles; the swelling persists, breaks, and discharges.

Reply—Give 10 drops of tr. arsenicum twice a day for a month on tongue. Swab out the place of discharge with spirit of iodine, at first daily, after a week or so once weekly. Dust it outside with chlorinated lime, commonly called chloride of lime.

Carrow Agricultural Bureau reports that a horse belonging to one of its members has a stake in its hoof, which is parting from the skin at the heels.

Reply—The stake has damaged the internal structures of the hoof, and the matter is trying to escape at the softest spot. Rather intricate surgical treatment is necessary to effect a cure; but as home treatment it will probably be best to stand the hoof in a solution of bluestone, a handful to a bucket of warm water, for half an hour every day; the bucket must not be metal. Then smear well with Stockholm tar, and put in a corner of a bag to keep clean; tie the bag round the fetlock with broad tape or a strip of bag, not string. If the hoof comes off it will be many months before a new one is fit for work.

"C.L.N.," Winton, reports that a yearling foal is troubled by the jaws swelling; the animal becomes stiff, and is unable to rise.

Reply—Worms are the cause of the trouble. Give a dessertspoon of Fowler's solution of arsenic once a day for three weeks, and a flat teaspoon of sulphate of quinine twice a day for 10 days. The former will be taken in a little feed, the latter should be mixed with a little molasses and smeared on the tongue or teeth, if it is not readily taken in the feed.

"A.S.J.," Hilltown, has a mare which scours badly; was affected with sand; is now very weak, and very thirsty.

Reply—Probably there is organic mischief, upsetting both bowels and kidneys, and treatment may not do much good; but try twice daily, in chaff, a powder made of 1 dram each chalk, catechu, opium, ginger. Do not allow her to drink her fill, and only water before feeding. A handful of pollard in the drinking water will help. If treatment is not a success in a week, stop it.

"G.A.H.," Wilkawatt, states that the sheath of a seven-year-old gelding was much swollen; the animal lost condition, and was easily excited.

Reply—The symptoms are those of bloodworms, and a severe attack, too. A course of Fowler's solution will help to mend matters, but it is quite probable the horse may go from bad to worse in spite of treatment.

The same owner also has a three-year-old colt, swollen on the shoulder, which feels flat with a hole in the centre.

Probably a seton run through the swelling and dressed daily with Venice turpentine and left in for two or three weeks would get rid of the trouble, which is glandular. "A.S.," Berri, asks if the meat of a blown animal, which is killed after hope of saving its life is given up, is fit for human consumption.

Reply—The meat from an animal killed at death's door, no matter what the cause of attack, is never safe food, but is often eaten without bad effect. It cannot be recommended, and if it causes trouble it is very severe, even fatal; but if under stress of circumstances it has to be used, the risk has to be taken. If the blown animal were killed before it was actually in extremis, then the meat would not be affected.

"J.D.," Tarcowie, has a four-year-old colt with swelling round the navel, gradually disappearing; otherwise in good health.

Reply—The pasty swelling is lymphatic, arising most probably from worm poisoning. It would be well to give a teaspoonful of saltpetre twice a day in food for three days. After, a course of two tablespoons of Fowler's solution of arsenic once daily in the food for a fortnight would do the colt good.

HORTICULTURE, ETC.

Replies supplied by the Horticultural Instructor (Mr. Geo. Quinn).

"W.S.," Rockleigh, seeks information with respect to (a) destroying soursops, and (b) preparing land for lucerne.

Replies—"Soursops" (Oxalis ceruna) may be killed out on a small area of land by persistently hoeing off, or skim digging the tops under, every few weeks, whenever they appear; but it may be necessary to follow this course for several winters in succession. A deep layer of straw piled over the spot, and well outside its margin, will, if lifted and turned over from time to time, prevent any shoots reaching the light, and thus kill them by preventing the completion of their vegetative action. I certainly advise subsoiling the kind of soil mentioned prior to sowing lucerne. If subsoiled it should be firmed down again by working, as lucerne needs a very fine and firm seed bed; rolling to crush lumps and consolidate the sublayers will probably be necessary, as well as the usual harrowing or scarifying. Deeply prepared soil will enable the plants to strike straight down and secure a better hold.

Myponga Agricultural Bureau reports that a small spider or louse is attacking a paddock of turnips.

Reply—If the pest has not disappeared before now, I advise dusting the affected fields with a mixture of sulphur and quicklime. The mixture may be put in a piece of open-woven hessian or bran bag and fastened to the end of a short handle.

"N.S.," Caltowie, forwarded specimens of insect larva found on apple trees.

Reply—These were identified by the Museum Entomologist, Mr. A. M. Lea, as belonging to the moth *Entometa ignoblis*. Mr. Quinn states that the best remedy is to gather and burn the cases containing the insects. When in the feeding stage the caterpillars may be poisoned by spraying the trees attacked with arsenate of lead 1lb. paste in 20galls. of water.

"L.H.," Langhorne's Creek, asks for information relating to raising orange trees, and a means of destroying soursops.

Replies—1. Orange seedlings are raised in specially prepared beds, which are sheltered with a glass or calico cover against extreme heat or cold. Take the seeds in about August or September fresh out of the fruits which have been left to rot in a receptacle. Sow them thickly in a prepared soil, made up of good sandy loam and well-decayed manure. Press the seeds into the soil, and cover them from in to 1in. deep in similarly mixed soil. Keep moist, but not sodden, and as the seedlings appear shelter them against cold, but expose to as much light as possible, to avoid weakening them. 2. Seedlings of the ordinary sweet orange are in this State used principally for stocks for orange trees. 3. Persistent hoeing every time leaves appear will gradually kill soursops. Covering them deeply in straw is claimed to kill them, more particularly if the straw is lifted and replaced at once, to prevent any shoots penetrating to the light.

"H.H.O.," Streaky Bay, requests advice regarding the application of sulphate of ammonia to cabbages, cauliflowers, lettuces, and peas.

Reply—Sulphate of ammonia is used as a solid on cabbage, cauliflower, and lettuce, by sprinkling it lightly around the plants in rainy weather, or hoeing it into wet soil lightly. It is, however, best used as a liquid manure poured around the roots. Used as a solid about 2oz. to the square yard is sprinkled, or as a liquid 1oz. to the gallon of water is poured around the plants, not on to the foliage. Peas, as a rule, do not need nitrogenous manures, but a little when they have just got well through the soil will often give them a strong start. Strong, quickly soluble fertilisers such as this are best applied in several weak doses.

AGRICULTURE.

Reply supplied by the Director of Agriculture (Professor Arthur J. Perkins).

- "N.Y.F." asks (a) at what stage should the cross-fertilisation of wheat plants be performed? (b) Is there a male and female wheat plant, and, if so, how can the sexes be distinguished? (c) Will wheat cross with oats, barley, &c.?
- (a) Wheat plants should be cross-fertilised when the ovaries (female organs) are sufficiently forward to take the foreign pollen,

and before the anthers (male organs) of the same flowers are sufficiently forward to shed their pollen, and so bring about self-fertilisation. In practice, you select both pollen and mother ears from plants one ear of which shows signs of incipient expansion, *i.e.*, one or two anthers hanging from the parting glumes. Never, however, use as a mother ear one in which the anthers protrude; they always involve danger from self-fertilisation. (b) The wheat flower is hermaphrodite, *i.e.*, both sexes are represented in the same flower, and so disposed that in ordinary circumstances self-fertilisation is the rule. (c) In all probability wheat cannot cross with either oats or barley, although the late W. T. Farrer thought—without, however, absolutely affirming it—that Bobs represented a successful cross between wheat and barley.

POULTRY.

Replies supplied by the Poultry Expert (Mr. D. F. LAURIE).

Carrow Agricultural Bureau reports the appearance of warts, scales, etc., on the legs of fowls. The cause and cure are requested.

Reply—The birds are suffering from what is commonly called scaly leg, due, as a rule, to a minute parasite. The best method is first of all to scrub the leg in warm, soapy water to remove dirt and also loose scaly material. Then apply kerosine and oil in equal parts. Repeat in a week. This mixture should be applied to all birds twice a year, and it will keep them free. Badly affected birds are not productive.

SUBSIDIES TO AGRICULTURAL SOCIETIES.

The Minister of Agriculture (Hon. C. Goode) has stated that, in view of the necessity for economising in all directions, the Government had decided that the usual vote for subsidies to agricultural and horticultural societies would not be placed on the Estimates for the coming year. The Government felt that the Royal Agricultural Society's example in foregoing the show would lead the country societies to consider whether they were warranted in calling upon their supporters for financial aid this year. Usually the sum of £1,350 was placed on the Estimates for subsidising the country shows.

THE COMING HARVEST.— ARRANGEMENTS FOR FREIGHT.

In connection with the question of freight for the oversea transport of the wheat available for export when the forthcoming harvest has been gathered, the following statement made by the Minister of Agriculture (Hon. C. Goode, M.P.) will be of interest:—

"I am in receipt of information that the Federal Government have entered into an arrangement with Elder, Smith, & Co., and Gibbs, Bright, & Co., to effect on behalf of the Commonwealth Government the chartering of all freights in connection with the coming harvest. No chartering will be allowed through any other source. The leading wheat merchants operating in the various States have been consulted in connection with this, and they are falling in with the arrangements, and loyally supporting what is now being done. In respect to the tonnage from each State, this will be allocated in proportion to the requirements of each State. The tonnage will be ascertained at a later date, when we will be in a better position to estimate what quantity of wheat and other freight we shall have to shift to the other markets of the world."

The Minister hopes to shortly announce detailed particulars of the arrangement.

FARM LIVE STOCK AND HOW TO LAY THE FOUNDATIONS OF GOOD STRAINS.

ADDRESS DELIVERED BEFORE THE MOUNT BARKER BRANCH OF THE AGRICULTURAL BUREAU.

(By the Director of Agriculture (Professor ARTHUR J. PERKINS.)

INTRODUCTORY.

I have been asked by your Branch to address you on "Farm Live Stock and How to Lay the Foundations of Good Strains." The subject, no doubt, is one of extreme importance, and whilst I shall do my best to deal with it adequately, I wish to emphasize at the outset that the choice of the subject is yours, and not mine. I am led to make this preliminary statement because I have a presentiment that to some of you what I may have to say will prove rather dull hearing. This is my first public address in the district, and I should be sorry to disappoint you. I am anxious, therefore, to divide the responsibility

for the results of this meeting. If the address fails to appeal to you, let me take full responsibility for its preparation and delivery; but on your shoulders be the responsibility for its choice.

IMPORTANCE OF LIVE STOCK TO AUSTRALIA.

First let us glance at what live stock mean to Australia; their economic value is enormous; far greater, perhaps, than is usually suspected.

I shall illustrate the position from the 1911 statistics. I have chosen this year in preference to later ones, because, since 1911, all the States of the Commonwealth have lost much live stock as the result of drought. I am confident, however, that the wonderful recuperative powers of the country will very rapidly make good these losses.

Table I.—Showing 1911 Live Stock Statistics in the Commonwealth and in South Australia respectively.

Livestock.	Commo	onwealth.	South Australia.		
	Numbers.	Value.	Numbers.	Value.	
Horses at £20	2,279,027 11,828,954 93,003,521 1,110,721	£ 45,580,540 82,802,678 69,752,641 3,332,163	259,719 393,566 6,171,907 93,130	£ 5,194,380 2,754,962 4,628,930 279,390	
eggs	_	3,953,331 £205,421,373		533,94I £13,391,603	
Capital value of live stock per head of population	_	£44 19 3	_	£32 0 6	

In this table both poultry and eggs have been included under a common total for value, because this is the only figure available in the official statistics; manifestly, however, "eggs" are not live stock.

In addition to live stock indicated in Table I., there were also in the Commonwealth goats, 270,973; camels, 10,045; mules and donkeys, 6,973; and ostriches, 1,891.

In Table I. figures relating to numbers are those of the Statistical Department, and therefore reliable; those having reference to values are my own, and represent what I look upon as average prices in normal times. And, since the basis of the calculations is indicated, those who do not agree with my results can readily vary them at will.

It is a noteworthy fact, however, that the capitalised value of the Commonweath live stock should have exceeded 200 millions sterling in 1911, and that of South Australia 13 millions. On a population basis this represents £44 19s. 3d. and £32 0s. 6d. respectively per head of population. This is a high average aggregate of wealth for one particular line.

LIVE STOCK AND EXPORTS.

It is possible to gauge the importance of live stock to Australia in another way, and that is by taking note of the importance of exports derived from the live stock industries comparatively with total Commonwealth exports.

Figures in Table II., have again reference to 1911—a year in which total exports reached high-water mark—

Table II.—Showing Values of 1911 Exports of Commodities connected with Live Stock Industries of the Commonwealth.

v	
Items.	Values. £
Wool Butter, cheese, &c. Skins and hides Frozen meat Tallow and lard Preserved meats, bacon, &c. Poultry, eggs, &c. Various	26,061,687 4,686,595 3,045,991 3,224,574 1,991,870 937,811 9,662 144,542
Total value of 1911 exports connected with live stock industries	£40,102,732
Value of 1911 total exports of the Commonwealth	£79,482,000
Percentage value of exports connected with live stock industries	50.46 %

Thus, then, in 1911 the total value of exports connected with live stock was over 40 millions sterling. In that same year the value of total exports from the Commonwealth was the highest hitherto recorded, namely, £79,482,000. Of this total, exports connected with the live stock industries were represented by 50.46 per cent., or over one-half. This will convey some idea of the extent to which we are concerned in the live stock industries for the payment of our debts.

I think that these few figures will enable us to realise graphically the importance of our live stock, and how near to the agriculturist is anything affecting their wellbeing and general profitableness.

LAND CULTIVATION DOES NOT REDUCE LIVE STOCK.

There is one more fact of a statistical bearing that I should like to bring under your notice before passing on to the particular subject of my address.

It is frequently stated that the breaking-up of large estates into farming areas will ultimately have the effect of ruining the live stock industries of the Commonwealth, and particularly the sheep industry. I think it can be shown that in spite of the vast areas that have been thrown open to cultivation within recent years this is very far from having been the case hitherto. In this connection I have endeavored to summarise the position in Table III.—

Table III.—Showing Progressive Rise in the Commonwealth of Land under Cultivation, and Live Stock carried, between 1860 and 1910.

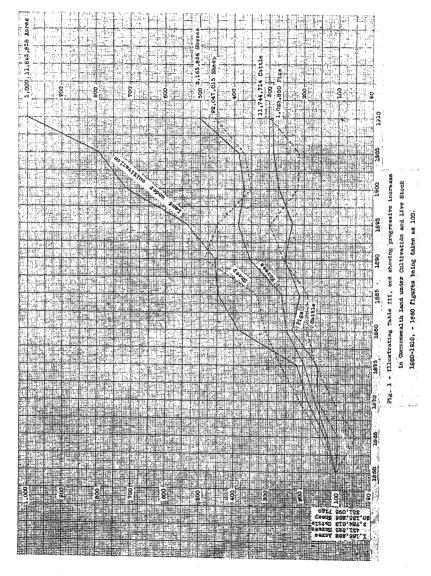
	Total Land Under Cultiva- tion.	Land Under Cultiva- tion; Area in 1860 taken as 100.	Total Horses.	Total Cattle.	Total Sheep.	Total Pigs.	Total Live Stock in Terms of Sheep.	Live Stock in Terms of Sheep; 1860 numbers taken as 100.
1000	Acres.	100	107 808		00 104 000			
1860	1,188,282	100	431,525	3,957,915	20,135,286	351,096	51,914,654	100
1865	1,585,714	133	$566,\!574$	3,724,813	29,539,928	345,704	60,616,749	117
1870	2,185,534	184	716,772	4,276,326	41,593,612	543,388	78,175,462	151
1875	2,576,006	217	835,393	6,389,610	53,124,209	549,808	105,348,654	203
1880	4,577,699	385	1,068,402	7,527,142	62,186,702	815,776	124,802,838	240
1885	5,306,762	447	1,143,064	7,397,947	67,491,976	748,908	129,525,777	249
1890	5,430,221	457	1,521,588	10,299,913	97,881,221	891,138	183,305,142	353
1895	6,450,620	543	1,680,419	11,767,488	90,689,727	822,750	187,293,326	361
1900	8,812,463	742	1,609,654	8,640,225	70,602,995	950,349	145,203,195	280
1905	9,433,455	794	1,673,805	8,525,025	74,403,704	1,014,977	148,840,445	287
1910	11,893,838	1,000	2,165,866	11,744,714	92,047,015	1,025,850	192,498,625	371

In this table, in establishing the sheep equivalence of the live stock of the Commonwealth, horses and cattle have been taken to correspond to seven sheep each, and pigs to three sheep each.

It will be noted from Table III., that in half a century—1860 to 1910—the area under cultivation in the Commonwealth has increased Over the same interval of time, which has witnessed exactly tenfold. the withdrawal from pastoral occupation of vast areas of land, the live stock of the Commonwealth has increased 271 per cent., or 3\frac{3}{4} times. And, moreover, excepting between 1895 and 1900 this increase in total live stock has been steady and progressive. The fall between 1895 and 1900 is, on the other hand, attributable not to the withdrawal of land from pastoral occupation, but to the effects of the great drought which decimated our flocks and herds. By 1910, however, recovery had been so complete that in that year total for live stock in the Commonwealth, reckoned at their equivalence in sheep, was the highest on record.

It may be said in this connection that the figures given refer to the total live stock of the Commonwealth, and that the withdrawal of land from pastoral occupation, has resulted in the displacement of sheep by other forms of farm live stock. If this were indeed the ease I can see no strong grounds for objection, since it would merely imply that in altered conditions other forms of live stock had been found to be more profitable than sheep.

A careful examination of Table III., however, will show that during the period under consideration sheep are very far from having lost ground in the Commonwealth. We may notice in the first place that, with the exception of 1890, there were in 1910 more sheep in the Commonwealth than was ever the case before. Nor, relatively to numbers present in 1860, was the proportional increase in sheep below that of



other farm live stock. Thus we see that in 1910 there were five times as many horses in the Commonwealth as in 1860, four and a half times as many sheep, and three times as many cattle and pigs. These

figures show no decline in the value of the sheep-growing industry of the Commonwealth.

I have given graphic illustration to Table III. in Figure I. herewith. The progressive rise and fall of the lines representing respectively the area under cultivation and the various types of livestock of the Commonwealth, indicates the position between 1860 and 1910. Sheep, it will be noted, have followed horses fairly closely.

It is said, too, with a greater show of reason, that the passage from pastoral to agricultural occupation must influence the character of the wool hitherto produced, and for which Australia has secured world-wide reputation; that, in fact, our wool will deteriorate. This contention—the relative inferiority of farm-grown wool—is no doubt correct. On the other hand, the combination of wool and mutton growing characteristic of farming operations is likely to prove more profitable than wool-growing alone.

In conclusion, it may be stated that rainfall conditions are such over much of our land that, where irrigation cannot be applied, the land will probably remain permanently in pastoral occupation. In the better rainfall areas, on the other hand, land will carry eventually, when farmed, far more live stock per unit of area than was possible under original pastoral occupation. There are two things that I think we have now succeeded in proving—(1) the enormous importance to Australia of the live stock industries, and (2) that in point of numbers, at all events, there is as yet no local sign of retrogression or decline in any one of these industries.

ECONOMIC POSITION AND FARM LIVE STOCK.

Now there is another factor of great economic interest, which I think very probably led your Branch to select the subject matter of my address, viz., farm live stock, and how to lay the foundations of good strains. On all sides it is coming to be realised that if farming is to continue profitable it must be associated with live stock operations in some form or other. The particular type of live stock adopted may depend on the bent of mind and personal idiosyncrasies of the farmer concerned, but, in the majority of cases, climatic and economic conditions will represent the deciding factors. it must be recognised that whilst many farmers are highly competent stockmen, the same cannot be said of the majority, who have been largely brought up under a system of farming which avoided live stock, beyond indispensable working horses. Handling, rearing, and particularly breeding other types of live stock, has in the past been left very largely to the station owner; hence in many cases the necessary instincts and habits are perhaps wanting. And it is because of this, no doubt, that much of our farm live stock is not what it should be, nor is it as profitable as it might be.

PERSONAL PRIDE IN LIVE STOCK ESSENTIAL TO GENERAL IMPROVEMENT IN TYPE.

Let us say at the outset that the very first step towards improving our farm live stock is that the farmer himself shall develop a proper personal pride in the animals he handles, independently altogether of any profit they may bring to him. Whilst I readily admit that in many instances the purchase and fattening of inferior animals may prove profitable enough; still, in the majority of cases, it costs quite as much to keep a poor beast as a good one; and a farmer who can tolerate on his farm poor, badly developed animals, however profitable they may happen to be, is not likely to do much towards the general improvement of our live stock; whilst the breeder who persistently adheres to inferior types of breeding animals, we must look upon as altogether hopeless. Such an one should leave breeding severely alone.

It appears to me that in a question of this kind, apart altogether from the stockman's natural professional pride, we should allow a little for patriotic sentiment. The dependence of the country on the live stock industries we have shown to be enormous; and surely breeders, altogether independently of their own interests, might look upon themselves as the guardians of our most precious possessions. The breeder who aims at improving his live stock contributes towards the increase of public good; the breeder, however unimportant, who lags behind and imagines that any animal is good enough, is a drag on the wheel of progress.

Instances might be multiplied in support of these views; one, however, must suffice for the present. Why is it that the average prices realised for our fat lambs on the London market are consistently below those of New Zealand lambs? Not because we cannot produce lambs quite as good as those from Canterbury—indeed, in individual cases it has frequently been done—but because the average lamb is ill-bred and inferior. The poor ones drag the good ones down, and until they are eliminated or reduced to an insignificant minority, we shall continue, as a people, to realise less than we should from a very promising industry.

The same argument applies to practically all forms of live stock, and I hope that all breeders will come to realise that, independently

of their own profits and losses, a great responsibility rests on them; and that the least important of them has a determining influence on our national prosperity.

The first step, therefore, towards the improvement of farm live stock consists in the development of that professional pride which will not tolerate a bad job.

THE BREEDER'S EYE.

Unfortunately, although love of and pride in live stock may be taken to be essential to improvement, they cannot stand alone; equally essential is the breeder's eye and judgment. This is not a character which can be acquired, although it can be improved upon by practice and experience. In other words, it is not given to everybody to be a good judge of live stock, and their latent possibilities as breeding animals. At the same time, if the average man is not able to distinguish between the fine points of difference which the first-class breeder is able to detect between two meritorious animals, he will, as a rule, be able to distinguish between a good and a bad animal; sufficiently so at all events to prevent him breeding from inferior animals, if he gives his mind to it.

On the other hand, good judges of live stock are to be found in all districts; and my experience of them is that they are usually willing to lend their help to others who are not so well endowed.

I take it, therefore, that the man who is aware of his deficiencies in this particular direction should not be below seeking advice from quarters best able to tender it.

PURE-BRED OR CROSS-BRED FARM ANIMALS.

Now, we cannot very well discuss the improvement of farm live stock without settling, as a preliminary, the type of animal best adapted to average farming conditions. And at the outset of any such inquiry—whether it concerns horses, cattle, sheep, or pigs—we are confronted with the question as to whether in average farming conditions pure-bred or cross-bred animals are likely to prove most suitable.

I do not think that a question of this kind can be answered authoritatively and definitely in one way for all cases. On the whole, however, I incline to the belief that a suitably chosen cross-bred animal is in the majority of cases best likely to meet the requirements of the average farmer. I do not wish to make light of the undoubted claim of pure-bred animals for special cases. I feel, however, that they do not meet the general average position.

ADVANTAGES OF CROSS-BREDS.

I think it will be admitted in a general way that cross-breds, suitably selected, present at all events several undeniable advantages.

In the first place, in many cases a suitable cross enables the farmer to combine in one animal the special aptitudes of two breeds. And when a farmer aims at putting his live stock to more than one use this is a great advantage.

Let us illustrate this point by one or two examples. I think, for example, that for the average farmer who combines dairying with general farming, a Jersey-Shorthorn cow, or a half-bred Jersey cow, is generally to be preferred to a pure-bred cow of either breed. The half-bred cow should be a good milker, produce a satisfactory quantity of butter, and finally die well, when required to—a point not without importance in these days of dear meat.

No doubt in special circumstances—in a city dairy for example—a very heavy milking Shorthorn cow might be more advantageous; in other cases a pure-bred Jersey might be preferred. But, for average conditions, the cross, I think, will prove the most profitable investment.

On a farm on which the rearing of early fat lambs is made a special feature, I am of the opinion that the half-bred long-wool ewe is likely to prove of greater value than the pure-bred Merino ewe. I am, of course, aware of the present difficulty of securing suitable ewes of this type in sufficient numbers. This does not, however, discount their value; and I believe that as the value of the latter comes to be realised more than is at present the case, the demand which will set in will have the effect of creating the supply.

I know that objections are sometimes raised to the breaking down by crosses of the highly specialised aptitudes of certain breeds—such as Jerseys, for instance—and that when dual-purpose animals are required, dual-purpose breeds are recommended in preference to crosses. For dairying purposes the Norfolk Red Polls would be a good example of these breeds. Without wishing to deny the existence of occasional pure-bred animals combining satisfactorily two more or less opposite tendencies, in my experience the average animal belonging to so-called dual-purpose breeds is never entirely satisfactory. According to the personal idiosyncrasies of the breeder from whose strain he comes, he will favor one side or the other, and is not generally as satisfactory to the farmer as a well chosen cross-bred animal.

Another advantage of the cross-bred animal is its invariable vigor and strength of constitution. I do not wish to infer that all pure-

bred animals are necessarily delicate; it is a fact, nevertheless, that many of them, particularly those reared by inexperienced breeders, are inclined to be delicate; and for average conditions this is a capital defect. This tendency of pure-bred animals to lack of vigor and rather weak constitutions is not necessarily the consequence of pampering and over feeding—although, in the course of a number of generations this helps to a certain degree—but more generally the consequence of close breeding or in-breeding. I shall have occasion to refer to close breeding later on; and I shall content myself for the present with the statement that there is nothing that tends to undermine vigor and constitution more readily than persistent close breeding in the hands of inexperienced breeders.

A third advantage to the credit of cross-breeding between closely related varieties or races of the same species is that it maintains fertility, and in many cases increases it. Here again pure-bred animals are not necessarily lacking in fertility; indeed, frequently the reverse is the case. It is only when close breeding is abused, or when animals have been grossly over fed, that natural fertility becomes impaired. And, unfortunately, from the show point of view it is frequently the finest specimens—the result of continuous close breeding—that are the least fertile, and occasionally quite barren. I may have occasion to deal with this subject later on; for the present let us note that generally cross-breeding is a guarantee of at least good average fertility.

These, then, form the chief reasons why for ordinary purposes I am inclined to favor cross-bred animals for average farms. In this I may say that I am not expressing a statement of personal preference; so far as I am concerned I prefer pure-bred animals, and this would be the case of every one who has in him any of the breeder's instincts. In stating the case for cross-bred animals, I am considering simply the general utility of the average case. I take it that it holds good on the average farm for dairy cattle, for sheep, in many cases for pigs, and even at times for horses.

CROSS-BREDS NOT MONGRELS.

But when I say that I believe cross-bred animals to be more likely to meet the case of the average farmer than pure-bred ones, I am not referring to mongrels or indiscriminately-bred animals.

A cross-bred animal is an animal of which one parent at least is pure bred; and if only one parent is pure bred this parent should always be the sire.

PURE-BRED SIRES INDISPENSABLE.

And this leads us to what must be looked upon as a cardinal point in breeding, whether we carry on our farms pure-bred stock or crossbreds. No farmer should tolerate on his farm any sire that is not pure bred. We cannot hope to improve our farm live stock unless this principle is not only recognised, but rigidly adhered to. The use of mongrel or cross-bred sires leads to general all-round deterioration in live stock of any kind; it leads to endless confusion, and destroys any chance of uniformity of type so essential in all matters of this kind.

This point is so important in all forms of breeding—and unfortunately so often sinned against in this State—that it is worth while emphasizing its value. The cross-bred or indiscriminately-bred sire may be vigorous, of excellent constitution, even of great personal merit in the matter of build, quality, &c.; and yet, from the breeder's point of view, he is quite useless; and why? Simply because the cross-bred sire lacks what is known as "race prepotency," or the ability to stamp on his progeny the special qualities and aptitudes that the hand of man has slowly and gradually accumulated in the recognised pure breeds.

Let me illustrate my meaning by a few examples. First, taking the case of a dairyman milking a herd of fair-grade cows. If he rears his own heifers, and takes any proper pride in his business, it should be his aim to see that, as much as comes within his power, each successive generation of milkers should prove an improvement on their predecessors, i.e., if the mother is a good milker the daughter should be a better one still.

Now, we all know that in breeding matters we are not dealing with certainties, but with probabilities; but it is our business to see that the odds are as much in our favor as possible. It is not impossible to get a good milker by a mongrel bull; but the odds are very much against it; let us say, 100 to 1. On the other hand, whilst there is no absolute certainty that a pure-bred bull of a recognised dairying breed will sire good milkers in every instance, in individual cases the odds are very much in our favor; let us say, 90 to 100. That is what is understood by a sire prepotent in certain aptitudes; a prepotency which is absolutely lacking in a mongrel animal.

More than that, it is a well-established fact, that animals sired by mongrels, or cross-bred animals, show a strong tendency to "reversion" or "throwing back." This is what biologists term "atavism." The position is that the mongrel sire, having no recently acquired race prepotency to boast of, very frequently the old species prepotency of his unimproved ancestors tends to reassert itself in his off-

spring, and the result is an animal little superior in many points to those that formed the starting point of the breed in the dark ages.

Take the case of early maturing fat lambs. No matter what the type of the dams, if we look to success we must use rams of pure breeds in which the aptitude for early maturity has been highly developed. A mongrel ram, besides other disadvantages, would be no better for the purpose than a Merino ram. And I am afraid the same may be said of many of the stallions that have been used on our farms.

I repeat, then, that a cardinal principle in all breeding is that the sire shall be pure bred, and possessing to a high degree race prepotency in the direction of those special aptitudes we wish to stamp on our live stock.

RELATIVE IMPORTANCE OF SIRE AND DAM.

Now, whilst it is naturally of advantage from the breeding point of view to have dams of high quality, it is not always possible economically and financially to realise this. Hence, in all cases, it is essential that the sire should be of higher quality than the dam; and that his influence should be towards the improvement of the next generation. Hence the qualities we wish particularly to be present in our cross-bred animals should be represented to the highest degree in the sires.

Thus, for a dairy herd, the sire should belong to a recognised dairy breed, and by inference possess higher innate dairying aptitudes than the cows. Jersey, Guernsey, or Ayrshire bulls would meet the case whatever the type of cows used.

For a farmer's flock there is nothing more profitable and reliable than the rearing of fat lambs. The essential in these is early maturity and good fattening aptitude. These qualifications should be represented in the highest degree in the breeds to which the sires belong. They have been developed in most of the modern breeds of English sheep. For other reasons, however, what are known as the Short Wool breeds are to be preferred as sires for fat lambs. As suited for the purpose in order of merit may be quoted Southdowns, Suffolks, Shropshires, and Dorset Horns. The latter have advantages over all the others in early maturity; defects are white face, coarseness, and rather weak legs of mutton.

In the matter of pigs, according to circumstances, the Berkshires or Yorkshires make excellent sires. Probably, however, if an export market in bacon developed the Tamworths will prove preferable.

For horses much depends on circumstances and on what is required. Many farmers, particularly those situated in the lighter types of soil, prefer rather light draughts; weedy animals, to my way of thinking. But, whatever the type, the sire must have breeding; incidentally, it may be said, that between the so-called roadster stallion and the pure-bred mongrel there is no essential difference. In the matter of pure-bred local sires, Clydesdales no doubt predominate; and very fine farm horses they make, too. Personally, I have a weakness for the modern Shire horse, but between good specimens of both breeds there is, perhaps, little to choose; the essential is that they come from strains embodying all that is good in the draught animal. Suffolk Punches, on the other hand, find favor with some; and the French Percherons have very strong advocates, both on the Continent of Europe and in the United States.

DAMS IN CROSS BREEDING.

Finally there is the question of the dams to consider. Given a purebred sire, the dams themselves may be pure bred, or as is more frequently the case, grades or animals of no particular breeding.

In this connection let us state at the outset that it goes without saying that the dams must fulfil two indispensable conditions. They must be normally fertile, or good breeders, and good mothers, i.e., able to rear their young satisfactorily. Additionally, in the matter of dairy stock, they must be good milkers.

From other points of view the question of dams, when cross-breeding is adopted, is difficult to treat in a general way. The simplest case, of course, is that in which female animals are not reared on the farm. The rearing of fat lambs is a case in point. If we assume the farmer to purchase half-bred ewes, the inference is that the lambs will all be sold as they become ripe for market, and the quality of the dams becomes merely a question of the judgment and ability of the farmer as a buyer. In cases of this sort the sires used by the farmer can have no influence on the future generations of dams.

This, however, represents a rather isolated case. Let us assume the position of a dairyman using, in the first instance, grade Shorthorn cows, and a Jersey bull. We may infer that he will retain his first-cross heifers, which would be half-bred Jersey cows. Possibly, too, he might retain heifers of the second cross, representing three-quarter-bred Jersey cows. If, however, he desired to retain any size in his animals, it might be necessary at this stage to change the

breed of his bull, and to fall back for a while on a Shorthorn bull of milking strain; reverting again to a Jersey bull for three-quarter-bred Shorthorn cows.

Cases of the sort might be multiplied indefinitely. The essential is that the dams should be of as high a type as our means permit of their being.

PURE-BRED LIVE STOCK.

Thus far I have dealt with cross-bred animals as being in my opinion generally best suited to the purposes and methods of the average farmer. It may be said further in their favor, that the adoption of them frees the farmer from many a knotty breeding problem. I would not have it inferred, however, that I hold the opinion that pure-bred live stock are altogether out of place on any farm. Indeed, from the point of view of personal inclination, I think I may say that I lean very heavily in the direction of pure-bred animals wherever they can be handled to any advantage.

A little reflection, too, will show that if the average farmer is to rear for the market, or for use, cross-bred animals, by pure-bred sires, and at times even out of pure-bred dams, there must be others to rear the pure-bred animals for him. And it is these men—the breeders of pure-bred stock—who will exercise the greatest influence on the improvement of our farming live stock. In many cases work of this kind will fall to farmers born with breeder's instincts in them.

We must now pass to a consideration of the various breeding problems which lead up to improvement in live stock.

Problems of the Breeder of Pure-bred Stock.

Now, the chief problems before the breeder of pure-bred stock may, I think, be summarised in the following manner:—

- 1. To maintain his animals up to the recognised standards of his breed, and, if possible, to improve upon them and correct faulty tendencies.
- 2. To maintain unimpaired the vigor and constitution of his animals.
- 3. To maintain the fertility of males and females alike at a maximum.

The realisation of these three objectives is not as simple as would at first sight appear; indeed, at times, they show a tendency to become mutually destructive, and in such circumstances it is the skill of the breeder that holds the scales even between them. It is, for example, possible by the use of practices we shall have to examine to bring individual animals to a pitch of practically perfect bodily symmetry and development; but, if in the process their constitution

or their breeding powers be undermined, of what possible use can they be to the breeder? This, indeed, is what actually happened in some of the earlier types of improved Shorthorns, which are described as having been show animals without a flaw, but quite unable to leave any descendants behind them.

SELECTION OF STOCK.

The maintenance or improvement of the characteristics of the breed are secured by what is known as "selection," and although the subject is well known, and perhaps somewhat hackneyed, it cannot be avoided in a discussion of breeding practices.

It may be stated in the first place that all the breeds of live stock, as we know them to-day, have been slowly built up through the course of ages by conscious or unconscious selection. There is no doubt but that all the domestic animals have been derived from wild ones, the regular descendants of many of which are still roaming over the earth. And, if, for instance, to-day the Berkshire pig is essentially different from the wild pigs from which it has sprung, it is because for a long period of time man has been picking out or selecting as breeding animals those individuals which apppeared to meet his requirements to the highest degree. And the same is true of all our domestic animals.

The process of selection therefore implies that man regulates what animals shall be allowed to mate together, and what shall not. It covers, therefore, two assumptions—

- 1. That from the point of view of the special requirements of man, some animals are more highly endowed than others.
- 2. That these animals are able to transmit to their descendants the special qualities that distinguish them from their fellows.

As to the first point, there can be no two opinions. We know, for example, that, given equal conditions, one cow will give more milk than another; that one sheep will cut a heavier fleece than another; that one horse will be more powerfully built than another, &c., &c.

The transmission, on the other hand, to offspring, of these special endowments is a far more complicated question, and involves that very intricate and much discussed subject, heredity. To this subject, however, great as is its importance, I am only able to refer in briefest outline.

HEREDITY.

When we make use of the term "heredity" we imply that parents have the power of transmitting to their offspring certain characteristics and aptitudes; and when in ordinary language we say that "like begets like," we tacitly recognise the existence of this power.

The general position in the matter of heredity, however, is far more complicated than might be inferred from this popular aphorism. Many important problems are involved, at which I can no more than glance in this evening's address.

CHARACTERS AND APTITUDES SUSCEPTIBLE OF BEING INHERITED.

Thus, at the outset, we are confronted with the problem as to what characters can be transmitted by parents to their offspring, and what cannot be transmitted to them.

Opinions have varied considerably on this particular point; and even at the present time biologists are very far from being in complete agreement on the matter. Briefly, there have been two schools of thought—those who held that characters acquired during life, in addition to innate characters, were susceptible of being transmitted to the next generation; and those who held that only "innate" characters were transmitted in this way.

Let us illustrate the position. An animal is born with a certain bodily conformation, and certain special aptitudes which he inherits for the most part from his parents and ancestors. These are the so-called "innate" characters; and no difference of opinion exists as to the individual's ability, in his turn, to pass them on to his own descendants.

But it is said the circumstances of life, environment in its widest sense, "use and wont," may lead to modifications in both bodily conformation and in individual aptitudes; and in this way new characters arise that are not innate, or born with the individual. And the question is are these "acquired characters" susceptible of being transmitted by heredity?

For the sake of clearness, let us concentrate our attention on a single case. We know that "good" and "bad" milking can do much towards modifying a cow's yield of milk. Let us assume a cow whose milking aptitude had been spoilt by bad milking. This would typify an "acquired character," and we are asked to believe that because of this purely accidental occurrence in her life, heifers from such a cow are likely to inherit this misfortune of their dam. And, further, we are also asked to believe by some that accidental mutilations are inherited in a like manner.

Only a very limited number of biologists still believe in the inheritance of these acquired characters. And it must be added that, apart from a few cases connected with accidents to the nervous system, no evidence of any value has ever been brought forward in support of these views.

From our point of view the chief point of interest is that a breeding animal can transmit to his offspring both his good and bad points; both his defects and his qualities. Let us note, too, that the bulk of these qualities and defects he owes to his ancestors; only a few, if any, are peculiar to himself.

BI-LATERAL INHERITANCE.

If we had to take into account the influence of heredity on one side alone—if for instance the individual were the offspring of a single parent—breeding questions would be very much simplified. But, as we are well aware, with all the more highly organised animals and plants, inheritance is "bi-lateral," or two-sided. That is, the individual inherits both from sire and dam. And it is easy to realise that these two influences—the influence of the sire and the influence of the dam—may be opposite in character. Hence it becomes the chief problem in breeding to see that the favorable influence from the breeder's point of view should get the upper hand.

Recent investigations would appear to show that, whilst an individual certainly combines in himself characters which he derives both from sire and dam, these characters are not in themselves blends of the possibly opposing characters of sire and dam, or a compromise between the two, but characters which were integrally present in one or other of the parents, the opposite character or tendency being obliterated, or remaining dormant and reappearing in subsequent generations. These are the "dominant" and "recessive" characters respectively of Mendelism.

I have no time to dwell upon this point at any length, and one illustration must suffice. I shall take it from color, because both striking and easily understood; although it should be added that color is frequently subject to blended inheritance. If, for example, a black Berkshire sow has a litter by a white Yorkshire boar, the young pigs will recall both parents in many ways; but almost invariably they will be wholly white in color. The color of the white boar is therefore dominant over that of the black sow.

This brings us back to the subject of "prepotency," since that parent will have most influence on the offspring which is prepotent over the other.

Now, other things being equal, the male is generally prepotent over the female; that is to say, under equal conditions the individual will recall his sire more than his dam. But in normal cases conditions are not necessarily equal, and we must consider how prepotency acts and how it is acquired. Now, if through a long series of generations the same character is reproduced in individuals of both sexes, it ends by becoming strongly impressed on the breed or strain, and individuals belonging to the breed or strain become strongly prepotent in this particular character. The high development of the hindquarters or legs of mutton in Southdowns may be taken as an instance of this.

And this is exactly what happens in the strains of all carefully-bred live stock. From generation to generation individuals excelling in certain points are selected for breeding purposes; and in the end the ideal type of the breed becomes strongly prepotent. And the older the strain the greater the prepotency. That is why long-established breeds and strains are always prepotent over more recent ones; and why the pedigree animal, whose line of descent is long, clean, and pure, is always prepotent over the indiscriminately-bred animal.

If, therefore, we wish to improve our strains of live stock, it is not sufficient to secure animals that are pleasing to the eye, and possessed perhaps of high individual qualities. In addition, they must possess to a high degree "race prepotency;" and this we can find with any degree of certainty only in pedigreed animals from reliable strains. The individual will be influenced most by the parent who possesses this prepotency to the highest degree.

IN-BREEDING.

Long pedigree is then a guarantee of strong race prepotency. It is not, however, necessarily a guarantee of individual prepotency in so far as individual peculiarities are concerned, independent of the characteristics of the breed or strain.

We may possess a well-bred sire, particularly well endowed in certain directions, in which his strain or breed is weak; good fore-quarter development in a Southdown ram, for instance; or good legs of mutton in a Dorset Horn ram. Since in either case the breeds are weak in these two points, we cannot anticipate that race prepotency will be active, and have therefore to depend on individual prepotency, which will probably be beaten by the race prepotency of the dams.

Now, there is a short cut to strong individual prepotency, which is frequently availed of by breeders who are endeavoring to improve their strains, and that is "in-breeding."

If, for example, the particularly desirable sire is mated with his daughter, the offspring will generally acquire a certain degree of prepotency in the special characters of the sire, who is both sire and grandsire at one and the same time. And this prepotency will be

even still further accentuated if the same sire is mated up with his granddaughters, out of his own daughters, and by himself; in the latter case he will be sire, grandsire, and great grandsire of his latest offspring.

Now there is no doubt but that in-breeding of this type has frequently been availed of with success by skilful breeders; and, apart from other considerations, it presents the advantage of impressing uniformity of type very rapidly on flocks and herds. It renders them, too, highly prepotent in this particular type. In-breeding is nevertheless a two-edged sword, and should, as a rule, be avoided by the average breeder; for if in-bred stock are prepotent in desirable qualities, they are prepotent, too, in whatever defects may be present in their blood.

Additionally, as I have already had occasion to remark, in-bred animals are inclined to be delicate; frequently lack developmental vigor and are weak-boned; they are subject to congenital weaknesses, and even to malformations; and what is worse from the breeder's point of view, they are almost invariably below the normal in fertility, and in extreme cases are impotent or barren.

No doubt in a state of nature a certain degree of in-breeding must take place among wild animals; but Nature knows how to provide against its evil effects. It throws upon the males the task of fighting for the females; and for them any lack of vigor or constitutional weakness is punished by defeat.

In any case it is noticeable among the domestic animals that the ill-effects of in-breeding make themselves felt most rapidly among animals which, in a state of nature, lead a comparatively solitary life, such as the pig. Normally gregarious animals, like cattle and sheep, stand in-breeding better as a rule.

It should be noted that the most dangerous form of in-breeding is that which mates together full-brother and full-sister. It should in all cases be avoided. On the whole, however, I think that the average man should restrict close breeding to the mating of first cousins.

CLOSE BREEDING.

When a satisfactory and well-known type has been established for a flock or a herd, there is a natural tendency to breed exclusively from within the flock or herd itself; the introduction of foreign blood generally has the effect of disturbing the type, or the family likeness of the animals, and frequently lowers their commercial value. Now, even without abuse of incestuous in-breeding, to which I have been referring, breeding exclusively within the flock or herd, however great their individual numbers, constitutes in the end close breeding.

And it is a matter of common experience that close breeding may in time, particularly in unskilled hands, give rise to many of the objections of in-breeding; that is briefly, the closely-bred flock or herd is exposed to losing both constitution and fertility.

There are, no doubt, many examples to show that the capable breeder knows how to avoid these difficulties. The French State Rambouillet Merino Flock, for example, has been bred within itself since 1800 without any loss of vigor or fertility. Here in South Australia, the Murray Merinos have been bred without change of blood for over 68 years.

But the average man is not necessarily an expert breeder; and would do well, as a rule, to avoid too close breeding. In any case he will be wise to avail himself from time to time of "out crosses," which should generally take the form of outside sires introduced into the flock or herd.

If importance is attached to type, precautions can be taken to see that the foreign sires are of closely-related strains; indeed they need be no more than what is known as "climatic out-crosses," i.e., animals of the same strain, but reared under different conditions of climate and soil.

Any disturbance of type in flock or herd that may arise from the use of foreign sires is not likely to be lasting in its effects; as a rule the natural prepotency of the closely-bred strain will in the course of a generation or two tend to re-assert itself, and the old ideal type will soon be recaptured.

Nor must we forget that constitution and fertility are of far greater importance than uniformity of type; and where need is everything else must give way to considerations for their safeguard.

SELECTION OF BREEDING ANIMALS.

If, then, we start from the premises that certain animals are superior to others in points that are of value to us; and that, providing they are prepotent, they are able to transmit to their offspring these desirable qualities, it follows that systematic selection applied to breeding animals must lead to improvement, providing at the same time we protect them against loss of fertility and constitution.

Hence, at the outset, every precaution should be taken to secure desirable sires; their offspring are more numerous, and therefore their influence is greater than that of the dams. If sires are retained from within the flock or herd, only those combining in themselves to a high degree the typical characters of the strain should be retained. They should be first-class animals, and additionally highly "masculine" in type; otherwise they are likely to fall short of their duties as sires.

The dams are always more numerous, and in a way their condition and quality is generally a test of the breeder's abilities. It is easy enough to purchase good sires from others. Dams, on the other hand, are usually bred on the spot, and are therefore the results of the breeder's own efforts. The dams must be vigorously culled from time to time, and only those should be allowed to breed which come up to the normal standard of the breed or strain. Weak or defective animals should be rigorously excluded.

In the great majority of cases the eye alone has to determine which, among a number of animals, are the most eligible for breeding purposes. Those who have the breeder's instincts have, as a rule, little or no difficulty in making their choice. All, however, are not in that happy position; and it appears to me that those who have not complete faith in their own judgment should have recourse to that of neighbors more fortunately endowed in that particular direction.

I do not wish to leave this subject without making reference to one method of selection, altogether independent of eye judgment, and within the reach of every one of us.

You will probably know that hitherto there is only one type of live stock that has been in the past rigorously selected on achievements and results, and not on eye judgment; I refer to the blood racehorse. For the last 200 years, at all events, it has been as a rule successful performers alone that have been admitted to the stud. And to-day, untried foals and fillies are purchased at high figures on the performances of their parents and ancestors.

Now, similar principles, from which similar results may be anticipated, might be brought to bear on our methods of selecting dairy stock. If dairy herds are consistently tested, we shall in time have a reliable record of the dairy performances of a number of cows; and in time, too, breeding animals need no longer be picked out on eye judgment, which is frequently faulty, but on the performances of their dams and ancestors.

This principle is being taken up very widely in other countries, and it is to be hoped that it will find favor here. Without a doubt it is calculated to do untold good to our dairy industry.

NECESSITY OF WRITTEN RECORDS FOR PURE-BRED LIVE STOCK.

This leads me to what is frequently looked upon as a tedious job, and as such, more or less neglected; and that is accurate records, having reference to all pure-bred breeding animals. If you are dealing exclusively with cross-bred animals, the same necessity for records does not arise; it is not necessary, for example, to know

their exact parentage. It is sufficient, as a rule, to be able to distinguish between half-bred and three-quarter-bred animals, &c., and this can generally be ascertained by a system of ear notches.

With pure-bred animals likely to be required for breeding purposes, this is quite otherwise. If we wish to avail ourselves of them with safety, we must have definite knowledge of their parentage and line of descent. If we lack this knowledge, it is quite impossible to avoid wrong breeding practices and undesirable mating. It follows, therefore, that every pure-bred animal should receive at birth, or after weaning, a special number, which is entered in a book, showing the name of sire and dam. Other data of interest can be entered in a register of this sort, such as milking performances, if cattle; fleece weights, if sheep, &c., &c.

A good memory in matters of the sort is no doubt an excellent thing; and we know that a good shepherd, living among his sheep, comes to know them individually. It is questionable, however, whether in the matter of pedigree everything can safely be left to the shepherd's memory. It is quite certain that it cannot be left to the memory of the average farmer, who has many other matters to attend to.

The practice of keeping written records is a useful one, and frequently leads to the formation of far more accurate ideas as to the value and performances of different animals than usually obtains.

On the other hand, if the keeping of records is found to be irksome to the breeder of pure-bred live stock, the only alternative open to him is never to use sires bred on his own farm. It is quite impossible in any other way to avoid in-breeding.

FEEDING.

Breeding is not the only problem connected with the improvement of farm live stock. You know the old saying that "half the breeding goes down the throat," although having reference to the get-up of show animals, is not without bearing on the general question.

There is no doubt that in South Australia there is a tendency to neglect animals in the matter of feeding, and this reacts on their constitutions and tends to degeneration and weakness and loss of vigor.

The fault lies very largely with the character of our natural herbage. Experience shows that this herbage is exceptionally nourishing, and that when present in abundance live stock do exceptionally well on it. And in such circumstances there is certainly no harm in rearing live stock on natural herbage whenever the latter is sufficient for all requirements.

Unfortunately this is not always the case, and as frequently no provision has been made for reserve stocks of fodder, much live stock suffers considerably, and frequently dies of starvation. So leng as these practices continue we cannot hope to improve our farm live stock to any extent.

I do not wish to decry good pasture land. Under favorable conditions it provides ideal conditions for the upkeep and fattening of all types of live stock; although I cannot agree that it is suitable for animals that are at work, particularly if they are worked all day, and have subsequently to walk all night in search of food. But for the production of milk, the production of flesh and fat, of wool, &c., it would be difficult to improve on good pasture at its prime.

However, pasture grazing is in this condition, even in the most favored of districts, for a portion of the year only; and for the balance we must make artificial provision for the upkeep of our live stock. It is not a question of simply keeping stock alive; their condition must be maintained, and their improvement such as to correspond to that which they would have made on good pasture had it been available. This implies the growing of suitable forage crops; the storing of suitable foodstuffs, such as hay, ensilage, grain, &c. Those who are not prepared to do this are not stockmen who are likely to do much towards the improvement of South Australian live stock.

FEEDING IN RELATION TO YOUNG STOCK.

From the breeder's point of view live stock suffer most from underfeeding in their early years, when they are building up their framework. It may be taken as an absolute rule that an animal that has been allowed to become stunted in its early days will be of little or no value as a breeding animal later on. At all events, it can do little towards improving farm live stock.

In this connection, generally speaking, it is wise to time the birth of young live stock with times of abundance in the fields. At this stage young live stock depend for their future development on an abundant supply of milk; and for this there is nothing better than good pasture. If pasture is not at the time available, or is at all backward, its place may for a while be taken by other rich foodstuffs supplied to the mother; but not for long. The young animal does not live on milk alone. Lambs will start nibbling grass within a few days of birth; and in their early stages there is absolutely nothing that can take the place of young grass for growing animals. Hence all young animals, apart from pigs, should be dropped at a

time of the year that will permit of their earlier days being spent in green fields.

Later on, when pasture is on the wane, and particularly after weaning, it is essential that they be sustained on nourishing and easily digested food. Hay chaff is the great stand-by of Australian feeders; and in its way, very excellent it is. Chaff alone, however, is not calculated to meet the requirements of young growing animals. With it, according to circumstances, must be fed more concentrated, more nitrogenous, more highly digestible foodstuffs, such as bran, grains, oilcake, &c.

There is this to be recollected, that if the feeding of a young animal off grass is continued on rational lines his growth will continue normally throughout the year. If not, his growth will be more or less arrested for portion of the year. He may retain his condition, even fatten, but he will not grow. He will miss, therefore, "early maturity," which represents a quick turn over and all its advantages in live stock operations. Finally, the growing animal must be consistently well and adequately fed throughout the years of his development.

In this cold district—with which I am acquainted by repute only—I would like to draw attention to one point. Throughout the plains to the north of Adelaide it is customary, and rightly so, too, to drop lambs in the early winter. In other words, we wish to take advantage of the winter feed that is usually available. I have seen the same practice adopted in the cold districts—the summer districts in fact. It may be adopted here for all I know. It appears to me that this is mistaken practice. Lambs should drop so as to catch the feed at its normal best. Hence, I think spring lambing should be preferred for districts of this kind.

THE FEEDING OF ADULTS.

In the matter of feeding adult breeding animals, there are two pitfalls to avoid—under-feeding and over-feeding. Both practices are likely to interfere with the prospects of the breeder and his chances of improvement. The ideal for breeding animals is good store condition; in other words, good health, good appetites, with no unnecessary reserves of fat.

Under-feeding, in difficult seasons, will not undermine adults to the extent that must be the case with growing animals. It should, however, be avoided. If, however, the choice lies between young and old, the latter will suffer less from the breeder's point of view.

It is less easy to defend oneself against over-feeding, since it will apply, as a rule, to the pick of the flock or herd—the show animals.

Personally, I believe very strongly in shows, and all competitive exhibitions. I think that every breeder who is anxious to improve his stock should avail himself of them. It is not merely a question of winning prizes, or a question of making the show a success. Unless a breeder can see his own choice animals side by side of those of others, he is apt to get an exaggerated idea of their value, and to lose his correctness of judgment. By all means, let all breeders exhibit their best, recollecting that whilst the prizes are few, the exhibitors may be numerous.

But shows have frequently done much harm, because of the insane idea of over-feeding show animals. To a certain extent one can understand the tendency in the matter of fat stock such as cattle, pigs, &c. But when we see stallions competing with fat oxen, the damage done to animals of real merit is incalculable.

It may be said that so far as fertility is concerned over-feeding does almost as much harm to breeding animals as consistent inbreeding. It is not unusual to see a first-class animal prepared for show return practically useless to the stud.

Let breeding animals, therefore, be kept consistently in good store condition; and use your influence to check the tendency to award prizes to the fattest animal in the show ring.

EXERCISE.

Lastly, all breeding animals should have the means of taking normal exercise for the development of their muscles, and for the smooth working of their internal machinery. Lack of exercise will frequently result in a certain degree of sterility.

Cows and sheep generally get all the exercise they want; frequently more in years of scarcity. The same may be said of brood mares on the average farm. Stallions, however, are often insufficiently worked, a fact which is frequently responsible for poor foalgetters. I am of the opinion that on a farm every stallion should be broken to the plough; a powerful animal of that type needs plenty of work to keep him in good condition.

Sows should be confined only when farrowing, but should be turned out into a field as soon as their litters are weaned.

SUMMARY.

Now let us summarise the position. For general purposes, and for the average farmer, I am inclined to favor cross-bred animals. Among the reasons for this preference may be stated the combining in one animal of the aptitudes of two breeds; the fact that a vigorous constitution is easily retained in cross-bred animals; the fact that the fertility of cross-bred animals is generally good and dependable; that breeding problems are reduced to their simplest expression.

By cross-bred animals we do not understand mongrels, but animals the sires of which are pure bred; and occasionally the dams. I emphasized the fact, too, that on no consideration whatsoever—if any improvement of live stock be aimed at—should any but pure-bred sires ever be used. As to dams—which always represent the great bulk of our flocks and herds—they should be the best that our purses permit us to acquire; and it should always be our aim to improve them in type from generation to generation by the use of sires of good quality. That at all times the dams should be good breeders and good mothers goes without saying.

But there can be no good cross-bred animals unless the country produces good type pure-bred animals; and it is with the breeders of these pure-bred animals that rests very largely the general improvement of our farm live stock. I have summarised very briefly the breeding problems that are to be met with.

I have pointed to the obvious necessity for selection in breeding that should apply to both sires and dams alike. I have referred very briefly to some of the difficulties connected with the inheritance of desirable qualities; the importance of prepotency in breeding animals; the dependence of the latter on pedigree and a long line of pure descent. I have pointed to the dangers of close breeding; to the degenerate tendencies of in-bred animals; to their loss of constitution and frequent lack of fertility.

I have pointed out that if the vigor and constitution of flocks and herds are to be maintained, the breeding of all animals must be known to the breeder. If this is found inconvenient the only alternative is the purchase of all sires from outside sources. Such a practice, however, will not necessarily lead to all-round improvement, since the best males reared on the farm could not be used.

I have drawn attention to the fact that for the most part improvement by selection rests in "eye judgment," which it is not given to all alike to possess. Hence I have strongly advocated direct selection by results for dairy stock by herd testing. Dairy cattle will then be brought to the level of racing thoroughbreds, which have been selected on these lines for a number of generations.

I have then emphasized the importance of feeding in the improvement of breeding stock. So far as the improvement of live stock is concerned this point is of greatest importance where young growing live stock are concerned. Young animals stunted in their early growth are not likely, if used later for breeding purposes, even to maintain the existing standard, and much less to improve upon it.

Adult breeding animals must be kept in good working condition; neither under nor over fed. In this connection, whilst I strongly favor competitive show trials, I equally strongly deprecate the overfeeding of animals which it usually entails. Finally, feeding should be combined with exercise for all breeding animals.

In running over these various points, I have done no more than point to a few matters which, if borne in mind, will, I believe, lead to improvement in our farm live stock. I cannot, however, pretend to have dealt with the subject at all fully. I have condensed in one lecture the material of a dozen or more. I may be allowed to entertain the hope that some of my remarks may prove of value, and may lead to improvements, however slight, in some of our live stock.

BULK HANDLING OF WHEAT.

The Minister of Agriculture (Hon. C. Goode, M.P.) has announced that the Government has finalised an arrangement with the Australian representative of the John S. Metcalfe Co., Ltd., of Canada, for the President and Chief Engineer of the Company, Mr. R. P. Durham, to immediately visit this State and prepare a report and recommendations in respect to the construction, maintenance, and operation of grain elevators and the handling, carriage, and shipment of grain in bulk. Mr. Durham will report in detail as to the number, location, capacity, and kind of country and terminal elevators respectively required for the handling of the South Australian grain crop, and will also make recommendations respecting charges and regulations, grading, and inspection. He will also prepare estimates of costs of constructing and maintaining any system which he may recommend, and, in addition, submit an estimate of anticipated revenue and expenditure in connection therewith.

The agreement provides for the completion of the services set out before the end of the present year. It is anticipated that Mr. Durham will arrive in Adelaide during the early part of the current month.

The experience of the President and Chief Engineer of the Company in question in the erection of grain elevators and similar undertaking in other parts of the world is such as to add the weight of expert authority to his opinions.

THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

The International Institute of Agriculture, which has its seat at Rome, has issued a brochure in which are detailed particulars of its organisation, its work, and the results which have attended its activities. The object of its work, as stated therein, is to defend and promote the agricultural interests of the entire world.

The idea underlying the institution was conceived in the mind of Mr. David Lupin, of the United States, who communicated it to His Majesty the King of Italy. As a result, a conference of interested States was held in Rome on May 28th, 1905, and a permanent Institution of Agriculture was founded shortly afterwards.

Article 9 of the Treaty, which was the outcome of the conference, sets out the objects of the institute as follows:—

The institute, confining its operations within an international sphere, shall—

- (a) Collect, study, and publish as promptly as possible statistical, technical, or economic information concerning farming, vegetable, and animal products, the commerce in agricultural products, and the prices prevailing in the various markets;
- (b) Communicate to parties interested, also as promptly as possible, the above information;
- (c) Indicate the wages paid for farm work;
- (d) Make known the new diseases of vegetables which may appear in any part of the world, showing the territories infected, the progress of the diseases, and, if possible, the remedies which are effective;
- (e) Study questions concerning agricultural co-operation, insurance, and credit in all their aspects; collect and publish information which might be useful in the various countries for the organisation of works connected with agricultural co-operation, insurance, and credit;
- (f) Submit to the approval of the Governments, if there is occasion for it, measures for the protection of the common interests of farmers and for improvement of their conditions, after having utilised all the necessary sources of information, such as the wishes expressed by international or other agricultural congresses, or by congresses of sciences applied to agriculture, or agricultural academies, learned bodies, &c.

The institute shall have no competence in any matter affecting the economic interests, the legislation, or the administration of any particular State. The "adhering States" constitute practically the whole of the civilised world.

The management is entrusted to a general assembly, and a permanent committee, of which the former is the supreme authority. Meeting as a rule once every two years, it examines the proposals of the Governments, and requests to be made to them, votes the total credits necessary up to the date of its next session, passes the accounts, and examines the reports of the permanent committee.

Executive authority is entrusted to the permanent committee. Each State is represented on the committee by one delegate, whose appointment is permanent, and who perpetually resides in Rome. The Australian representative is Sir James Wilson, K.C.S.I.

The work of the permanent committee is facilitated by the appointment of advisory commissions, permanent or temporary. The permanent commissions are four in number, corresponding to the four large divisions of the institute. One deals with strictly administrative matters. The others study the problems with which the three Bureaux—those of Statistics, of Agricultural Intelligence and Plant Diseases, and Economic and Social Intelligence—are concerned.

The first-mentioned, known as the general secretary's office, has the library and the Bureau of Agricultural Legislation as dependencies. In June, 1914, the library contained over 33,000 volumes and 28,000 pamphlets. Since 1909 the library has published a weekly Bibliographical Bulletin, giving the titles of books received, as well as the titles and short accounts of the principal articles in the reviews abstracted in the various bureaux.

The Bureau of Agricultural Legislation publishes a Year Book of Agricultural Legislation, containing the full text of the most important laws and regulations relating to agriculture promulgated in the preceding year.

The Bureau of General Statistics is responsible for the publication of a monthly bulletin, the Year Book of Agricultural Statistics, and special monographs. The Monthly Bulletin of Agricultural and Commercial Statistics contains information relating to the agricultural production of the whole world, the area sown, the state of the crops, the forecasts, and the harvests actually yielded, the import and export trade in the principal agricultural products, their price, and the amount of visible stocks, together with other similar information. The bulletin appears in five editions at once—English, French, Italian, German, and Spanish.

The Year Book of Agricultural Statistics contains official statistical information in regard to the important crops and the livestock in the 55 States adhering.

The object of the Bureau of Agricultural Information and Plant Diseases is to keep farmers informed in regard to all the technical progress made in the various branches of agriculture, agricultural industry, and livestock improvement, the plant diseases that make their appearance, and the remedies discovered and employed to arrest their propagation. This bureau publishes a monthly bulletin in five languages, and, when neccessary, monographs on current questions.

The Bureau of Economical and Social Intelligence publishes a monthly bulletin giving a review of all the important events occurring in the field of agricultural economics. It has also been responsible for a certain number of monographs, the most important of which are the monographs on agricultural co-operation in various countries.

In addition, each bureau sends short communications to the press, giving a concise account of the contents of the various bulletins or communicating the principal statistical data which may be of special interest for the public. These leaflets are distributed free to the press of the entire world.

Under the heading of "Practical action exerted by the Institute on the adhering States," it is pointed out that in the domain of agricultural statistics every effort has been made to induce the Governments constantly to improve their services, and organise them on uniform bases. With the object of facilitating this movement, a volume on "The Theoretical Bases of International Statistics" has been issued.

In the domain of agricultural technique and plant diseases, information relating to methods of cultivation has been collected and communicated to farmers. Attention has been given to the protection of birds useful to agriculture, and to the question of agricultural meteorology.

The International Phytopathological Conference, held at Rome in 1914, formulated a treaty, the States adhering to which engage to take measures in the direction of (a) the foundation of one or more institutes of scientific study and research; (b) the organisation of an efficient service of supervision over cultivation, packing, and dispatch; and (c) the establishment of certificates of health. In accordance with this last clause, importation of plants, to which the Convention of Rome applies, will only be allowed into the contracting States on production of a certificate of immunity from plant

disease, delivered by the competent officer, the only exemption being for living plants imported for study in scientific institutes duly authorised by the Governments.

The contracting States undertake to forward to the institute all information of administrative, scientific, and practical nature relating to plant disease, and the institute in turn will communicate it to all the Governments.

The questions of agricultural co-operation and insurance have been given attention, as also have other questions of vital importance to the agriculturist.

The worth of an institution such as this cannot but appeal to a country which is principally dependent on its agricultural resources.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

FEEDING AND REARING CHICKENS, DUCKLINGS, ETC.

In commercial poultry breeding success depends largely upon the percentage of chickens raised to maturity, and upon the results of the foods given and methods of feeding, &c., adopted. Among hen-reared chickens and ducklings many losses are due to cats, rats, &c., to vermin, and to insanitary conditions, including overcrowding.

ESSENTIALS.

Given good breeding stock, from which class alone you can expect good, sound progeny, you must have proper accommodation. Where the chickens or ducklings are running with hens (fowls or turkeys) various arrangements may be made. In many cases good results may be had if the mother be confined in a large coop (not cramped for space, as is often the case) while the chicks can run about outside; special openings in the coops must be made. Under some conditions this method is open to objection, as the wandering chickens have not the protection of the mother hen. In other cases the hen and her charges are housed at night in a small poultry house, and during the day have liberty. In some poultry breeding establishments special

buildings with outside runs are erected. Provision is made for a hatching compartment, inside run for wet weather, and outside run for fine days. Although expensive to erect, these arrangements answer well, if only there be broody hens available when required, which is not always the case.

Artificially-hatched chickens require brooder accommodation. T have reared thousands of chickens in small boxes warmly lined, and without the application of heat. There are numerous descriptions of brooders on the market. Some are the so-called "fireless," i.e., no artificial warmth is applied; others are hot water heated, and others hot air heated. In all heated brooders there should be provision for accurately controlling the temperature, and there should be ample ventilation without draughts. The hot air and hot water heated brooders depend on kerosine lamps for the source of heat. Electric bulbs and radiators are occasionally used, so also is gas. For heating large brooders on the single "mammoth" or on the pipe systems, special heaters or stoves burning coal or coke or charcoal are by far the most economical.

Plans of a serviceable and easily constructed hot air kerosine-heated brooder can be obtained at this office on application. Sketches and details of large brooder houses, with stoves and hot water piping, can also be supplied in special cases.

Brooders should be operated in rat-proof sheds or in properly constructed brooder houses. Many losses occur through predatory animals.

TEMPERATURE AND VENTILATION.

These are important points. Overheating is a serious matter; overheated chickens never recover from the ill effects, although they may Chickens should, as a rule remain at least 24 hours in the incubator before removal to the brooder. Where this is inconvenient. they should be removed to brooders heated to about 100deg. Fahr., and after a few hours the temperature should be gradually lowered to 90deg., at which it remains for the first week, then 80deg. for another week, and then 70deg. This, as a rule, suffices for cold weather; due allowance being made for bad weather. During a mild spell the temperature after the first week may be 75deg., and at a fortnight the birds will do well without day heat, and at three weeks without any artificial heat day or night. When the chickens are young they run out of the warm brooder; they have not sense enough to find their way back, and so become chilled. Chills of this nature are responsible for bowel troubles and high death rates. After the chickens have become accustomed to running in and out of the brooder the more fresh air and sunshine they get the better. The aim should be to keep them warm at intervals as a hen does, and also to accustom them to an active life in the fresh air. Brooders with outside runs on the ground are by far Ventilation is important, and rather difficult to control with the best. Poultry of all sorts and of all ages must many makes of brooders. have a free supply of fresh air. If they breathe vitiated and foul air, the system, through lack of oxygen and overcharging with carbon Top ventilation is the proper dioxide, becomes poison saturated. Care must be taken with hot air brooders that only hot air and no fumes from the lamp enter the hover or hot portion. crowding is a common fault. It is generally recognised that brooders sold as of 100 chicken capacity will only accommodate 75 for the first week, and 50 or even less the second week. Overcrowding means overheating and lack of fresh air. When the chickens breathe vitiated air their vitality is quickly lowered, and they lack warmth, and will crowd to the warmest parts of the brooder. In their search for warmth the stronger trample on the weaker, and in the morning you find a big Overcrowded chickens in ill-ventilated brooders become death roll. This is not due to sweating, as is often erroneously stated. Fowls have no sweat glands. In the act of respiration vapour is given off by the lungs, and in the absence of adequate ventilation condenses on the chickens as moisture. It is obvious that if through overcrowding you lose half the original number of chickens it would have been better in the first instance to provide double the brooder accommodation. Space does not admit of details of dimensions of brooder houses, inside and outside runs. Those desiring information can obtain same on application and in accordance with individual requirements.

Foods.

There is much diversity of opinion among breeders and writers on poultry. Foods and methods which may answer well with special lots of chickens, or where the operations are on a small scale, would not prove successful or workable where thousands of chickens are concerned. The first point to remember is that neither chickens nor ducklings, goslings and turkey chicks require any food for at least 48 hours after they are hatched. Nature has provided for that period, during which the little bird gets its "legs" and learns to run about, &c. If a newly-hatched chicken be dissected it will be seen that the balance of the yolk of the egg had been drawn into the abdominal cavity just prior to hatching, and that it is still unabsorbed. It takes sometimes 60 or 70 hours before the yolk is completely absorbed. The chicken, in its natural state, would not have strength to forage for its food until it "found its legs" during the first two or three days. When the

hen takes her chickens for their first walk she scratches about, and they learn their first lessons, but of actual food they gather but little.

Therefore, keep them warm until they show evident signs of hunger. They may have coarse sand to pick at and water to drink. for the first month should be cracked grain. In poultry papers I still read that hard-boiled egg-a most indigestible food-is advised in conjunction with bread crumbs. Hard-boiled egg finds no counterpart in Nature—it is an unnatural food. Infertile eggs taken from incubators at testing time may be used as follows:-Mix rolled oats, meal, or bran and pollard with the egg yolk, and feed to the chicks. As a rule a sticky mixture results, and the chicks are not over fond of it. beat the eggs with skim milk, and add to the mash. I do not recommend wet mash for young chickens. Some people hold that the first food should approximate in composition the contents of an egg, but that The first food of a chicken in the natural state would be is surmise. minute insect life, and therefore highly nitrogenous, and the same may be said of the ducklings. Of all the foods, experience on the poultry stations has proved clean, sound wheat cracked into pinhead size and sifted, to be the most satisfactory for general use. After a few days. the chicks have dry mash in special troughs or hoppers. mash consists of ground wheat, barley, and a little maize (if obtainable), and sometimes bran and pollard are added, or they are used Five per cent. of each meat meal and charcoal grit are added. The cracked wheat is provided in small hoppers or troughs, and some is also scattered in litter to promote scratching. When obtainable shelled oats, groats, or skinless oats are used in the cracked grain hoppers, and also in compounding the dry mash. Pea meal and bean meal are highly nitrogenous, but as they are somewhat bitter to taste, can only be used in small quantities added to the mixture. Grit in the form of very coarse sand and fine gravel, a little shellgrit and bonegrit is essential. These may be kept in a hopper mixed. Observation will reveal which of the several constituents of this grit hopper are being most readily There are specially prepared chicken mixtures on the market, and those I have tried are excellent. Canary seed must be used with caution—the husk is hard, and is not digested. An oversupply may cause impaction and indigestion, and ultimately death. It will pay the breeder to carefully watch the chickens when feeding; it is, of course, essential that each one eats its food, &c. Green feed is of great importance. Where chickens have liberty, even at a very early age, they eat large quantities of green food, generally tender growths of It is, therefore, foolish to chaff up coarse, hard, fibrous green stuff for chickens. This is a hard lesson to teach. quired, up to a fortnight, are the tender growths of barley grass, and very young barley, oats, &c. The coarse stems, &c., are never eaten, and it is useless to feed them. As they grow older the little birds may have kale, silver beet, berseem, and lucerne, but the growth mustalways be tender and succulent. The grain may be merely cracked in thirds, and may consist of wheat, hulled oats, and maize. mash should be supplied in hoppers of increasing size as the chicks Experience shows that in the chicken-rearing yards the dry mash hopper is the greatest contributor to success. As soon as possible, say, at six weeks old, separate the sexes; with the heavy breeds this may be deferred a few weeks. The chicks thrive much better, and you are enabled to concentrate full attention on the more valuable As regards the little cockerels, you can soon begin culling. Remove a few of the best to a separate cockerel yard, and give them due attention: these will be your future stud birds. Culls should be marketed at an early date—you require the room they occupy for the One contributing factor to the successful growth pick of your flock. of chickens is to give them fresh ground as often as possible. confinement, move them from run to run, always renovating the soil beforehand.

DUCKLINGS.

Ducklings do not require such elaborate quarters as do chickens, but it is equally important to guard them from cats, &c. Ducklings are best housed in low sheds floored with soft straw. The various flocks may be separated by 12in, boards, which can be removed as required. Young ducklings do not require water to swim in; many erroneously think so, and lose many birds in consequence. Ducklings must be kept as dry as possible, snug, but not overcrowded, and well provided with fresh air. They require little heat if kept in brooders. One main essential to success is to keep drinking water within their reach day and night. If ducklings have no water supply when shut up for the night they become very thirsty. The next morning they rush the water pans and drink greedily. Congestion results, and they topple over and rarely, if ever, recover. The drinking vessel should stand in one corner on a wire netting "grid." This "grid" covers a small pit, a few inches deep, to catch the drainage. This keeps the quarters dry. The pit must be frequently attended to, and kept sweet. the water vessel and the ducklings there should be a little barrier made of stout wires set vertically. The ducklings can put their heads through to drink, but cannot indulge in a splash. The water must always be deep enough to enable the ducks to immerse their heads completely. Failure in this matter will result in sore eyes and bald heads. The food should be wheat meal and barley meal, with maize meal added, when obtainable. The proportions may be three parts each wheat and barley meal to one of maize meal. Failing these, scald bran one part, and dry off with pollard two parts. An equal quantity by bulk of finely chaffed green food should be mixed with the meal or bran and pollard mixture. For the first few days the mash should be rather dry —later on it may be fairly moist. As soon as the ducklings are feeding well a little animal food may be added, and the amount gradually Meat meal from 5 to 10 per cent. made into soup used for moistening the mash; or soup made of liver, rabbits, or scrap meat, Experience proves that, while may be used with the boiled meat. chickens can be reared without meat, animal food is essential to success in rearing ducklings. Ducks of all ages consume large quantities of grit. Provide, therefore, near to the food supply, a small trough containing coarse, sharp sand, shell, gravel, and charcoal grit. The water supply should be as far from the food as is convenient. little ducklings grow they need increased amounts of food, and should have unlimited green food. At about six weeks of age those for market should be separately penned and fattened, while stock birds should be kept growing and well fed until they are strong, and at three months old fit to turn into larger runs, supplied with water to swim in. ming is the natural exercise of ducks, and is essential to success with stock ducks, i.e., breeders. Ducklings are soft, unwieldly, and easily damaged. They must, therefore, be kept very quiet, and on no account hustled. As they grow they must be subdivided again and again, until, when fattening, the divisions in the sheds contain from four to six Handle as little as possible, and when lifting a duckling do so by the head, not by the body, and one in each hand only, not more. Ducks are shade-loving birds. The hot sun is disliked, and sunstroke In hot weather the birds of all ages must be may carry off numbers. kept as cool as possible, and have plenty of green food. waves feed largely on green food chaffed and placed in shallow pans of cold water.

Goslings.

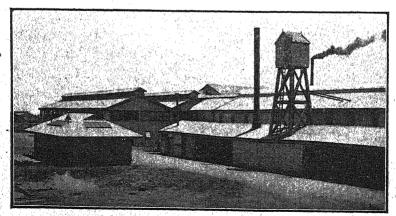
require much the same general treatment, but they are hardy birds; and are soon able to roam about. They eat large quantities of green food, and may, therefore, be economically reared on farms. Fatten well before sending to market.

TURKEY CHICKS.

are generally given in charge of a hen, although they can be reared in brooders. Turkey chicks have small crop capacity, and need feeding little and often. Similar food to that used for chickens will serve. They do very well with cooped hens. Beware of overcrowding, and give them plenty of fresh air. Houses which are suitable for chickens are not airy enough for turkey chicks. Get them into open sheds as soon as possible. Finely chopped onion and garlic tops may be fed to turkey chicks with advantage, they readily eat various green foods. Turkey rearing is not recommended in town, or in the suburbs. For success, free range is necessary with the growing poults. They then need careful housing every night.

SUMMARY OF ESSENTIALS.

Breed from the best stock, and of sound constitution only. the young birds carefully from all enemies. Keep a strict lookout for external parasites. Use commonsense brooders, well ventilated, and in a sanitary condition at all times. Do not overcrowd—use more brooders if necessary. Do not overheat. Use thermometers. cannot guess the heat required. Keep the young chicks close to the warm brooder for a few days. Do not feed for at least 48 hours. Note carefully the methods of feeding, and foods suggested. Allow no food to become sour. Keep an ample supply of clean water, and clean and disinfect water vessels frequently. Ducklings must at all times, day and night, have access to drinking water. Do not use salt meat, it will kill ducklings. Quicklime is dangerous, especially with ducks. Gypsum (sulphate of lime) is a good deodorant, and if sprinkled carefully will keep the quarters clean. Use no spices or patent nostrums. Make cleanliness and thoroughness your bower anchors—you will then hold success.



Government Produce Export Depot.

ADVISORY BOARD OF AGRICULTURF.

The monthly meeting of the Advisory Board was held on Wednesday, July 14th, there being present Mr. F. Coleman, the Director of Agriculture (Professor A. J. Perkins), the Principal of Roseworthy College (Mr. W. J. Colebatch), Messrs. T. H. Williams (Chief Inspector of Stock), G. Auld (President of the Vinegrowers' Association), J. Miller, C. E. Birks, and A. M. Dawkins.

MEMBERS REAPPOINTED.

A communication from the Minister of Agriculture (Hon. C. Goode) intimated that he had reappointed Colonel J. Rowell, C.B., Messrs. A. M. Dawkins and G. Jeffrey, and the President of the Vinegrowers' Association as members of the Board.

ELECTION OF OFFICERS.

Mr. F. Coleman, formerly Vice-Chairman, was unanimously elected Chairman, and Mr. C. E. Birks was unanimously elected Vice-Chairman.

AUSTRALIAN STANDARD CORNSACK.

The Secretary reported that the following letter had been duly forwarded to the Right Honorable the Prime Minister by the Premier of South Australia, in accordance with a recommendation made by the Advisory Board to the Minister of Agriculture on March 19th, 1915:—

Sir—The attention of the Advisory Board of Agriculture has been drawn to the difficulties raised at shipping ports by the Customs authorities in connection with the Australian standard (41in. x 23in.) cornsack, when filled with wheat. The Board point out that producers are very awkwardly situated in this connection, and request that the matter may be brought under the notice of the Commonwealth Minister for Customs.

The position so far as the Board is concerned may be summarised as

1. The Chapman sack, which is now universally used throughout the Com-

monwealth, is the only recognised legal sack for grain.

2. The dimensions of this sack have been fixed definitely by law; and the Board understands importations of sacks are officially passed by Customs officials.

3. This sack is not supposed to exceed the 200lb. limit.
4. In ordinary circumstances, new sacks, fresh from the harvester, will not exceed the legal limit. In years of heavy bushel weight it will depend a good deal on the effectiveness of the cleaning machinery whether or not the 200lb. limit is exceeded.

5. The chief difficulty, however, arises when grain is cleaned a second time, and particularly when the grain is graded. In these cases the sacks are slightly stretched, when filled a second time, and the removal of chaff and other

light material makes it almost impossible to keep to the legal 200lbs.

6. Consequently the farmer who cleans his wheat, and particularly the farmer who grades it, must fill the sacks on a weighing machine; and if he does not want to have a slack sack, which is awkward for handling and stacking, he must fold in the edges when sewing up.

7. The Board feel that in this matter progressive farmers are unnecessarily penalised, and respectfully suggest to the Minister of Customs that the Customs authorities be instructed to accept as legally filled all Chapman sacks, what-

ever their weight.

In bringing the matter under your notice, I have the honor to request that action may be taken by the Customs authorities to remove the difficulties complained of by the Advisory Board.

To this communication the following reply has been received from the Prime Minister:-

Sir—With reference to your letter of May 18th, No. D.A. 194/15, on the subject of the Australian standard cornsack, I have the honor, at the instance of my colleague, the Minister for Trade and Customs, to inform you that great difficulties would ensue in complying with the request of the Advisory Board of Agriculture.

To do so would encourage the use of sacks other than those authorised under the Cornsack Proclamation, and would be likely to revive the difficulties and

complaints against which that Proclamation was directed.

Cases continue to occur where representatives of the Wharf Laborers' Unions complain that sacks containing goods are loaded to an extent beyond that contemplated by the Proclamation, and the Department of Trade and Customs has to insist, in such cases, that at the very least, the goods shall be repacked, in order to keep within the limit.

As in the circumstances compliance with this request would be reactionary

in its effect. I regret to inform you that it cannot be granted.

A similar letter had been forwarded to the Premiers of the several States of the Commonwealth, and replies indicated that the Premier of Western Australia did not consider the desired action to be necessary; the Premier of Tasmania did not favor any change; and the Premier of New South Wales could not support the suggestion. Premier of Queensland had no objection to the innovation, but mentioned that his State was not an exporter. The Board concluded, in the circumstances, that there was nothing more it could do in the matter save to publish the foregoing correspondence.

BINDER TWINE IN CHAFF.

The following report from the Chief Inspector (Mr. G. Quinn) on binder twine in chaff was read:—"The inspectors inform me that it is a general practice at the chaffmills to remove only such of the binder twine as is necessary for sewing up the bags of chaff. Doubtless the twine other than the knotted portion becomes disintegrated in the cutting process, as in my mechanical analyses it has not been detectable. I am of the opinion that the knots should not be included, as the Veterinary Lecturer (Mr. F. E. Place) states that they form the nuclei of calculi in the stomachs of stock. Binder twine is without doubt a foreign ingredient under the Act, and therefore action may be taken against anyone who sells chaffs in which it is found." Professor Perkins thought that wherever possible those who offended should be prosecuted. As a step to that end Mr. Williams suggested that not only should the chaffmills be registered, but that the cutters should be obliged to place their brands on the bags of chaff sent out. Eventually the board decided to recommend that prosecution should take place where the circumstances warranted such a procedure.

COMPULSORY DIPPING OF SHEEP.

In respect of a letter from the Naracoorte Branch of the Bureau with reference to the compulsory dipping of sheep, the Secretary reported that the Government had amending legislation under consideration. Mr. Williams said that recently it was stated in the press that the Minister of Agriculture had informed a deputation at Mount Gambier that the dipping regulations had been relaxed. As a matter of fact, the Minister had telegraphed to him as follows:—''Dipping not relaxed, but act sympathetically.'' That meant that in cases where there were weak sheep that could not be mustered, or ewes with lambs affected with lice or tick, the Stock Dpartment would use its discretion, and act sympathetically. There would be absolutely no relaxation of the regulations, however, in cases where people travelled from one place to another sheep infected with either of the pests referred to.

LIMESTONE IN THE SOUTH-EAST.

The Mount Gambier Branch submitted a request that the Government Geologist should make a survey of the limestone deposits in the district, and report, with a view to the utilisation of the material for agricultural purposes, and also that the Geologist should furnish his opinions on the machinery necessary to crush and burn the limestone. Mr. Colebateh said the request referred to deposits in the agricultural areas, and as lime would be required for the most satisfactory development of those lands, he moved in favor of having it complied with. This was carried.

MALLEE SHOOT SCORCHER.

Two Branches of the Bureau revived the question of granting a bonus for a mallee shoot scorcher. The Secretary explained that the production of an effective and economically reasonable scorcher was of very great importance, and that fact had been brought directly under his notice during a recent visit to the Coomandook Branch. In that district the desire of a large number of the farmers was to crop their

land, and then let it lie out in pasture for five or six years for grazing, in which time the stumps would rot, through the agency of moisture and white ants. That could not be done, however, until some suitable device for destroying the mallee shoots became available. The board, after discussion, suggested that the matter should be discussed at the conference of the "East of Murray" Branches of the Bureau at Tailem Bend.

MEDICINES FOR FARMERS' STOCK.

A request was received from the Forster Branch, that, when the Government veterinary officers prescribed for ailing stock, the advice should be accompanied by the necessary medicines, as under the existing practice the affected animal often died before the medicine could be obtained. Members felt that Branches of the Bureau might well have a "medicine chest," suggestions for which had been printed in the Journal, and it was decided that the request could not be entertained.

DESTRUCTIVE MAGPIES.

The Monarto Branch expressed a wish that the Board should use its influence with the Government to have the magpie removed from the list of protected birds, as it was a pest at seeding time, and pulled up the young wheat plants. Members agreed that, although the magpies certainly did some damage, they were very valuable insectiverous birds, and therefore the application of the Branch could not be supported.

LEAVE OF ABSENCE TO MEMBERS.

At the instance of the Blackwood Branch the Board approved of the names of members of Branches serving with the Expeditionary Forces being retained on the membership rolls.

THE AFRICAN BOX THORN.

A recommendation was received from the Milang Branch, endorsed by several other Branches in the South, "That the African boxthorn be placed under the Noxious Weeds Act." It was decided that the Board could not depart from their previous decision in regard to this matter.

BERSEEM FROM MCNAMARA BORE.

A sample of berseem, 2½ft. high, and representing the second cut since the seed was sown the first week in March, and sprinkled with bore water, was tabled by the McNamara Bore Branch.

Life Member.—Mr. S. Thomas, of the Amyton Branch, was made a life member of the Bureau in recognition of his long and effective connection with the institution.

New Branch.—Approval was given to the formation of a Branch of the Bureau at Bundaleer Springs, with the following gentlemen as members:—Messrs. J. Travers, J. Lawrie, F. C. Giles, K. Giles, M. O'Dea, W. P. Barry, W. Cook, F. Pollard, P. Kerin, T. Kerin, M. Kelly, M. Cronin, L. Case, J. H. Forth, J. Dick, and S. H. Ellis.

New Members.—The following gentlemen were approved as members of the Branches shown:-Murray Bridge-S. Cameron, R. Smeaton, J. Cowan, S. McIntosh, H. H. Hoare, W. Hobbs, J. Jenkins, C. A. Mole, C. H. Watts, J. A. Thiele, J. Legg; Yadnarie—J. H. Henderson; Yallunda Flat-H. Wood, G. Gill; Watervale-J. Halls; Clare, W. R. Dempster; Laura—C. G. Carvosso, H. Cockshell, J. Acott. J. Hincks, J. C. Richardson, G. Rohrlach; Berri-N. Sprigg, W. H. von Bertouch, C. Weston, J. C. Cheriton, C. H. Brand, A. Setterberg; Redhill—A. Smith, H. Gadd; Spalding—J. Brogan, M. A. Dowd; Renmark-G. W. Best; Hartley-H. P. Harvey, C. Hudd; Kingston-on-Murray—W. Petersen, W. Polke; Yeelanna—P. T. Stagg, F. G. Davis, W. Roseworthy, P. Scholz, E. A. Smidth; Forest Range—G. Brockhoff; Parrakie-F. W. Randall, W. Temby, G. Warren, H. Warren; Crystal Brook—E. J. Wood, W. H. Thomas; Strathalbyn—J. Conlin, A. Caldwell, T. B. Dodd; Mindarie—O. Payne, B. Coad; Borrika— R. E. Penfold, L. A. Stodart; Mount Compass-E. Correll; Watervale-J. Ward, jun.; Blackwood-S. Harvey; Mypolonga-H. Hill, R. C. Rowley, A. H. Guenther; Elbow Hill-J. B. E. Wake, A. C. Wake, E. Story, P. Zerk, W. Nicholas, F. Chilman, H. Phillips; Strathalbyn-H. Frear; Pine Forest-W. Cavarett; Yadnarie-J. R. Carn, W. C. Ziersch; Willowie-A. P. Greig; Coonibba-E. A. Hasting; Hilltown-A. Just, J. Brabbick, J. Hefferman, M. Sommerville, E. Dall, G. Kennedy, M. Kennedy, P. E. Boxer, J. Brogan; Coonawarra-E. W. Clayfield, J. Clayfield, J. Fowler; Narridy-T. Arbor, T. Welborne; Warcowie-John Jones, J. J. Ryan; Milang-D. S. McBain; J. McMillan, M. J. O'Shaughnessy, H. Landseer, S. B. Ness; Redhill— T. H. Torr, C. B. Holmes, J. Pilkington.

ANALYSES OF FERTILISERS.

The following are the results of analyses made by the Government Agricultural Analyst (Mr. C. B. Chapman), of samples of fertilisers taken by inspector and assistant inspectors under the Fertilisers Act since the beginning of the present year:—

			Phosphate.	ohate.					F	
Name of Firm and Fertiliser.	Water	Water Soluble.	Citrate Soluble.	Soluble.	Acid Soluble.	luble.	Nitrogen,	Sen.	Fotash,	sp,
	Vendor's Guarantee	Result of Analysis.	Vendor's Result of Guarantee Analysis.		Vendor's Guarantee	Result of Analysis.	Result of Vendor's Analysis. Guarantee	Re-ult of Analysis.	Vendor's Guarantee,	Result of Analysis.
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	27.0	30.0	9.00	1 %	43.0	45.2	3.25	3.7	11	11
Mineral super. Super. B	36.0	37.4	14.0	18.4	4.0	9.9		1 1	11	
Bee & Hill's store,	30.0	34.1	1		1		1	1	1	
Worth)	27.0	30.4	3.0	2.5	3.0	1.1	1	I	promote and the same of the sa	1
Dec & Till a glore,	36.0	38.45	1	İ	ı	1	1	1	1	1
Anders, E., & Sons— "Victor" bonedust		1	1	l	40.0	41.4	3.0	4.3	· 	
Crompton & Son— Pure bonedust			1	l	42.67	46.3	es es	3.9		
rre	11	11	11	[]	42.67	44.7 26.3	3.8	4·1 6·4		11
	36.0	36.3	1	l		I	1	I	1	ı
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Government Produce Department— P.E.D. bone manure P.E.D. bonedust P.E.D. blood manure	111	. []]	111		23.5	30.5	5.75 4.00 12.00	6.68 4.1 12.20	1	

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45.00	43.6	1	1	1	1	!	1	1	1
31.00	31.2	1	1		1	1	1	1	1
29.00	5.87	5.0	2.1	4.0	4.3	1	1	1	1
30.00	45.0	1	1	1	1	1	1	ı	l
45.00	46.5	1	I		1	I	1	I	1
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36.00	35.15	1	1	1	1	1	1	1	1
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36.0	35.2			1	1		ı	1	1
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30.0	30.5	1	1	1	1	1	1		1
28.50	20.5	4.50	23	0.0	9.0	0.79	0.38	1	-
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28.50	-56-6	4.50	4.6	9.00	9.1	0.55	0.43		1
36.0	38.3	1	1	1	ı	1	ı	1	1
27.0	27.0	3.0	3.20	3.0	2.1	ı	1	-	1
		76 - 10	1	17	0.44			-	
	27.00 2.29.00 30.00 30.00 30.00 30.00 30.00 30.00 26.00 27.0		27.0 27.0	39.00 43.6 31.2 46.5 46.5 38.2 	39.00 48.6 46.5 28.6 38.2	39.00 43.6 28.6 46.5 38.2 38.1 38.1 38.2 38.1 38.1 4.6 38.1 38.1 4.0 38.2 38.1 4.0 38.7 4.0 38.7 5.4 6.0 38.7 4.0 38.7 30.5 4.5 30.6 38.7 30.7 30.6 38.7 4.5 4.5 4.5 4.5 4.6 4.5 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.6 4.7 4.6 4.7 4.6 4.7 4.6 <	39-00 43.6 28.7 46.5 38.2 36.16 38.7 44.8 36.16 38.7 4.6.6 36.16 36.16 38.7 4.6.6 36.16 36.16 38.7 4.6.6 38.7 4.6.0 38.7 4.6 38.7 4.6 38.7 4.6 5.4 6.0 38.7 38.7 4.6 5.4 6.0 38.7 38.7 4.6 5.4 6.0 38.7 38.7 4.6 5.4 6.0 38.0 38.0 38.0 38.0 38.0 44.50 45.0 45.0 45.0 46.0 47.0 48.3 5.4 6.0 8.6 8.7 8.8 9.0	89-00 —	39.00 — — — — — — 48.6 — — — — — — 46.6 — — — — — — 46.6 — — — — — — 38.2 — — — — — — 38.2 — — — — — — 30.6 — — — — — — 36.15 — — — — — — 36.16 — — — — — — 36.16 — — — — — — 36.16 — — — — — — 36.16 — — — — — — 36.17 — — — — — — 27.8 4.0 5.4 6.0 3.3 — — 27.8 4.0 5.4 6.0 4.3 — — 28.7 4.0 5.0 5.0 5.0 5.0 5.0 38.9 —

GEO. QUINN, Inspector of Fertilisers, &c. The figures shown above in respect to Metropolitan Abattoirs Board-Blood Manue take the place of those incorrectly printed (in last month's issue of this Journal) in the column set apart for "Water Soluble Phosphate" instead of in "Nitrogen" column.

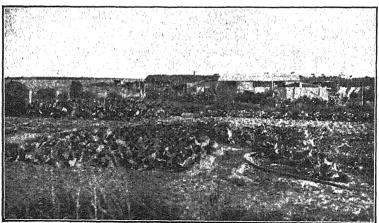
July 28th, 1915.

MAIZE AND VEGETABLES GROWN AT WILKAWATT.

The accompanying illustrations are of interest, as indicating the possibilities of that area of country generally known as the "Pinnaroo District."

No. 1 is from a plot of maize grown by Mr. W. J. Tylor on his holding at Wilkawatt. The maize was sown on December 20th, and was first cut on





February 8th, by which date it had reached a height of 6ft. 9in. A second crop grew to a height of 3ft. The land on which it was grown was a white

sandy flat, 12in. deep, over a clay subsoil, the cultivation which it received being as follows:—Stumps were grubbed; the land was then left in a rough state for 12 months; stable manure was then lightly spread, and it was cultivated to a depth of 6in. on the day prior to sowing. The seed was planted in trenches 4in. deep, and lightly covered with stable manure. The crop was irrigated by running bore water along the trenches about twice a week. The bore from which the water was drawn is situated a distance of two miles from that of Mr. Neville. Water from the latter has been analysed with the following result:—

	Grains per
	Gallon.
Sodium chloride and other chlorides calculated as sodium chloride	34.8
Calcium carbonate and magnesium carbonate calculated as calcium carbonate	27-0
Sodium carbonate	. 2.0
Other salt (magnesium sulphate, &c.)	13.2
rn . 7 - 313	
Total solids	77-0

Mr. Tylor believes the analysis of water from his bore to be similar to that of Mr. Neville's.

No. 2 illustration is from a photograph of the garden of Mr. Neville.

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of July, 1915, 12,920bush, of fresh fruits, 7,871bush, of bananas, 31,060 bags of potatoes, 1,070 bags of onions, 288pkgs, of vegetables and 175pkgs, of plants, seeds, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 22bush, bananas (over-ripe), 8bush, citrus fruits (no certificate), and 1pkg, plants containing vines were destroyed. Under the Federal Commerce Act 111pkgs, of citrus fruits and 2pkgs, plants were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 105pkgs, citrus fruit; for London, 6pkgs, citrus fruit; for India, 2pkgs, plants. Under the Federal Quarantine, Act, 99,810pkgs, seeds, bulbs, plants, &c., were examined and admitted from oversea markets. Of these, 38pkgs, of grass seeds were detained for the purpose of grading out weed seeds.

PHYLLOXERAL INVESTIGATION.

VISIT TO RUTHERGLEN.

REPORT BY THE VITICULTURAL INSTRUCTOR (Mr. H. E. LAFFER).

Leaving Adelaide on April 14th, I reached Rutherglen on the evening of April 15th. The following morning, in company with Mr. Mowat, Sub-Inspector under the Phylloxera Board, I commenced a series of visits to the representative vineyards of the district.

In common with the rest of Australia, Rutherglen has experienced a severe drought, although, so far as the vineyards were concerned, the effect was minimised by a good fall of rain during December. The weather up to and beyond the setting of the fruit was exceedingly dry. Early hot conditions were experienced, with the result that in many cases the vines shed their crop more or less completely. Prospects both for growth and fruit were most unpromising; but, fortunately, the situation was saved in a measure by the late rains, which put new vitality into the vines. They were enabled to recover somewhat from a bad start, and although the crop was in most cases very considerably decreased, they have at least good pruning wood for the present season.

It may be said that the reconstituted vineyards stand out in marked contrast to those on old Vinifera stocks, of which there are now but a small proportion of the original 20,000 acres remaining. These latter are for the most part very weak, owing to the combined effects of phylloxera and drought. Even on the rich river flats, where the vines have held out longest, they are badly phylloxerated and rapidly dying out.

Reconstituted vineyards of all ages are looking remarkably well when one considers the climatic conditions prevailing throughout the past two seasons, and they are an excellent testimony to the vigor and adaptability of the resistant stocks which have been used. In this connection one must not lose sight of the fact that, with the reconstitution of their vineyards, the Rutherglen vignerons are sparing no expense to insure the thorough preparation of the land before planting. It is in most cases broken up to a depth of from 18in.

to 21in. by means of powerful subsoiling ploughs, and such a preparation cannot fail to be productive of good results. The roots of the young vines are from the outset enabled to obtain a deep hold, and the plants to make correspondingly strong growth. Following this there is greater power of resistance to drought, and, further, in the case of Vinifera stocks, deep-rooted, vigorous vines are better able to withstand the attacks of phylloxera for some few years.

One point which it would appear must be strictly guarded against is the overcropping of the grafted resistant vines. In South Africa experience demonstrated that vines normally resistant to the disease succumbed owing to weakness induced by excessive fruit production, and in Rutherglen some vineyards which have been allowed to fruit too heavily in the first years of cropping have suffered severely in general vitality. On the other hand, those vineyards which have been carefully pruned in order to regulate crops have made excellent wood, and appear to be of good vigor. Generally the effect of the summer rain is to be seen in the quantity of fresh green growth on the vines.

The principal vineyards visited were Mount Ophir (Messrs. Burgoyne and Co.), Mount Athol (Mr. A. Prentice), Fairfield (Messrs. Cullen and Wallace), St. Leonards (Mr. H. E. Ireland), Messrs. Masterton and Dobbins, Mr. McKnight, the Wahgunyah State Nursery, and the Viticultural Station.

The bulk of the reconstitution up to the present has been done on the following stocks:—3306 and 3309 (Riparia x Rupestris), 41B (Chasselas x Berlandiere), A.R. G1 (Aramon x Rupestris Ganzin), 1202 (Mataro x Rupestris), Rupestris Du Lot, and, to a less extent, Rupestris Metallica Cape. On the whole, little exception could be taken to any of them so far as actual appearance went; nor does there appear to be any very marked difference between the results of the vinifera varieties upon the stocks above mentioned.

The main places of interest were the Wahgunyah Nursery and the Viticultural Station. At the nursery some of the vines were just assuming their autumn tint of foliage, and when one considers the season through which they have just passed, and the shortage of water for irrigation purposes, the general appearance of the grafted vines was remarkably good.

The estimated output for the season is about 300,000, and for the greater part the young vines are strong in the union. In addition to the grafted rootlings, a large number of rooted American cuttings are available. These are raised mainly from the wood which is too small for grafting, that is, below ‡in. in diameter.

The vines so raised are either field grafted or else "bud grafted" after planting in the vineyards. Field grafting appears to be advantageous in the case of the Berlandiere hybrids, owing to the fact that they develop their root system but slowly from the cutting, and frequently the scion suffers or dies from lack of nourishment in the early stages of growth.

In connection with the nursery there are a number of mother vines, representing the various species, from which a great deal of the resistant wood is obtained. The supply is, however, inadequate, and the balance is obtained from plantations in other localities. There are also some of the so-called "direct producers" under cultivation, but none of these have up to the present time proved of any particular value with respect to their fruit.

The collection of vines at the Viticultural Station forms a most They are grafted upon American stocks of interesting section. various species, and comprise many vines, both in table and wine varieties, new to Australia, and which should in the future prove of considerable value to the industry. Some of them are synonymous with varieties already cultivated in one or more of the States, and which have, up to the present, been distinguished by some local or vernacular name. For instance, the grape known in South Australia as "Sweet Water" was sent to France, and identified as the Palomeno of Spain, and imported vines of this variety prove to be identical with the local vine. Another imported table grape, "Valency," is synonymous with the Belas Blanco, while "Bicanne" and our own Raisin des Dames are the same. The well-known Waltham Cross, so popular as a table grape, and which is dried on the irrigation settlements as "Malaga," is identical with the "Rosaki" of Spain, in which country it is dried extensively. so-called "Shepherd's Riesling" of New South Wales is the "Semillon," while "White Hermitage" is the same as "Ugni Blanc."

These identifications are interesting in so far that they demonstrate how many varieties in this country are known at present by some incorrect or vernacular name. It might, therefore, be a recommendation for future consideration that an Ampelographical Committee should be entrusted with the task of establishing uniformity in the nomenclature of our vines.

Of peculiar interest are the varieties used in Europe for the production of the famous "Port" wines of Portugal. So far no definite conclusion can be arrived at regarding their value in this country, as time alone can establish their claim to be either better or more drought resistant than existing varieties, such as Shiraz.

Certainly "Mondeuse" shows promise as being a heavier cropper than the Shiraz, and is somewhat like it in general appearance, while "Touriga" appears to be more resistant to drought than does "Alvarelhao."

Amongst the new white varieties may be mentioned the following as possessing characteristics likely to make them of value in the future:—Allicante Bouchet, Folle Blanche, Montils, Charello, Caligrano, and Pinot Chardonay.

Some twenty odd acres are devoted to the testing of mother stocks, most of which, with the exception of those already noted, are as yet in comparatively small areas. Many of them show considerable promise, particularly as applies to their resistance to drought, and growing as they are under identical conditions, these vines afford a very interesting means of comparison.

The following species and hybrids were specially noted:-

Stock.	Pedigree.	Condition.
106-8	Rip. x (Cord. x Rup.)	Good
420a	Berlandiere x Rupestris	Good
41b	Chasselas x Berlandiere	Good
157-11	Berl. x Riparia	Good
420b	Berl. x Riparia	Good
84-3	Vinifera x (Mataro x Rup.)	Very strong growth
333	Carbernet x Berl	Good
34e	420a x 157-11	Good
301-64	Berl. x Rupestris	Very spindly growth
219a	Berl. x Rupestris	Good
62-66 ,	Vinifera x (Rup. x Cord.)	Fair growth
3103	Bourrisquou x Rupestris	Resistant to salt
601	Bourrisquou x Rupestris	Resistant to salt
125-1	Riparia x Cordifolia	Fair growth
1305	Vinifera x Rupestris	Good
554-5	Complex hybrid	Promising
3306	Riparia x Rupestris	Good—one of the best
3309	Riparia x Rupestris	Good—one of the best
ARG1	Aramon x Rup. Ganzin	Good
$1202 \dots \dots$	Mataro x Rupestris	Very good
Rupestris du Lot	Pure American	Very good
Rup. Metallica .	Pure American	Fair

As time and opportunity allow, the most promising of these stocks will be tested with Vinifera scions in order to demonstrate their affinity as graft bearers.

In another portion of the station are some areas of Malbeck, nine years old, upon stocks of 101-14, ARG1, 3309, and Du Lot, and although there was no very marked difference between them, those on 3309, 101-14, and Du Lot had the greatest amount of growth.

Shiraz upon similar stocks showed the best growth with 3309, Metallica, and Du Lot. These plots bore out the impression gained from the general run of reconstituted vineyards within the district regarding the adaptability of the various stocks.

Mr. H. E. Ireland's vineyard is worthy of some special reference as being one of the few instances of irrigation applied to wine varieties. Situated on the banks of the River Murray, with soil of a loamy nature, this vineyard was systematically irrigated during the past season, not excessively, but sufficient to bring the amount of available moisture well up to the general average and to carry the fruit over critical dry periods. From old vines in resistant stocks phenomenal yields were taken, and although one might expect the contrary, in spite of heavy returns, the densities were fairly high. Young vines, one and two years old, had made exceptionally good wood as the result of the water.

It was here I had the opportunity of seeing the "bud graft" fairly extensively used upon field-worked vines, and I was very much impressed with its possibilities. It apparently entails no very special skill to carry out as against the ordinary field graft, but when the two are compared, it is seen that the excellence of the union of stock and scion place the bud graft to the fore. Some of the few remaining Vinifera vineyards are upon the sandy soils adjoining the Murray, but they are for the most part badly phylloxerated. Many of them gave out with remarkable suddenness during the past season, leaving the fruit unmatured on the vines.

Looking at the Rutherglen district as a whole, one sees where some 20,000 acres of vines have been completely eliminated by phylloxera. Cellars and the necessary plant capable of dealing with huge bulks of wine have been for years, and are still lying, idle. Without exaggeration, the capital value of these vineyards, cellars, etc., might be put down at close upon one million pounds sterling, and practically the whole of that would represent a dead loss if it were not possible to resuscitate the industry through the agency of American resistant vines.

New South Wales is in a somewhat similar plight, and South Australia is the only important vine-growing State of the Commonwealth which remains so far free from the disease. It must be admitted that we stand exposed to disaster to a large and important industry similar to that which has overtaken the other States and almost every vine-growing country of the world.

That our vineyards are clean is rather a remarkable fact considering that Victoria was infected about forty years ago. Fifteen years have sufficed to blot the Rutherglen vineyards out of existence, and create a situation bringing disaster and financial ruin to many who were intimately connected with the industry in that locality.

Realising the marked good fortune which has protected our own vineyards throughout these years, we must yet admit that at any moment the dreaded insect may be located upon the vines in any one of our districts. Our methods of inspection are excellent so far as they go, but they do not give us immunity from the acts of some disinterested but none the less erring individual, who unwittingly brings a vine into the State in ordinary personal luggage, and with it establishes one of the most destructive insect pests of the world.

Looking at the question from all sides, I am of the opinion that, in order to safeguard the viticultural industry of South Australia, and to afford some measure of insurance for invested capital, there needs to be certain relaxation in the laws relative to phylloxera in order to allow for provision of means to deal with the disease in the only effective manner should it at any time be found within the State. I refer to the introduction of American vines for the establishment of a mother vineyard, from which wood can be obtained immediately consequent upon an outbreak. I fear that if this is not done, then during the time which might be spent fruitlessly fighting the disease and establishing vineyards of resistant wood for propagation, many of our large cellars will do down to the condition of those elsewhere, wine stocks will become depleted, and the export trade will be lost never to be regained. I do not for a moment suggest that, should phylloxera be found in any one of our winemaking districts all restriction would be automatically removed and no effort made to combat or confine it.

These districts, Southern, Central, Barossa, Angaston, Northern, and Murray Settlements are sufficiently isolated one from the other to admit of the disease being confined in any one locality for at least some years. Strictest quarantine regulations would have to be enforced regulating the passage of vines or other plants likely to carry the infection from one district to another.

The main point for consideration is, that the area under bearing shall be maintained as far as possible at its full capacity until the whole of that area shall be reconstituted, and the only way in which this can be done is to replant gradually from the time when the old vineyards begin to die out. By this means the expense of replanting will not be felt to the same extent, and vignerons will not be totally disheartened by seeing their vines die out and their capital vanishing, until, when the destruction is complete, they have not the means to replant their vineyards.

I submit that the replanting of our vineyards must keep pace with the destruction of the old vines, and this is only possible if we are able to supply grafted rootlings within three years of the first discovery of the disease. It cannot be denied that, since phylloxera first made its appearance in Europe, all extinction treatments have been unsuccessful. Cultural treatments have, with the exception of rare instances, failed, and even under the most favorable circumstances the life of the vines has been prolonged but a few years. Every country has been ultimately forced to adopt the American resistant stocks, and these have, with more or less success, proved the salvation of a vast industry, involving many millions of acres of vineyard and countless capital.

In South Australia the capital invested in vineyards is very considerable, covering at the present time some 26,000 acres, wine cellars, drying plants, etc. We should profit by the experience of the less fortunate countries and the neighboring States of the Commonwealth by avoiding the errors committed by them before the disease was completely understood.

During the past two seasons, as the result of the abnormally dry conditions, returns in the form of wine and dried fruit have fallen very considerably in the State. The vintage returns for 1915 will show a big shortage over the demands of the trade. In fact, even at the present time, this shortage is apparent in certain classes of wine, and makers are taxed to the utmost to keep up their outgoing supplies. If, then, one year of drought is going to produce such an effect, how much more pronounced will this be when stocks are depleted owing to the ravages of phylloxera?

Many of our South Australian vineyards are becoming of a considerable age, when the vines, even under normal conditions, lose much of their vitality. Conditions of drought so recently experienced have severely tried even young vineyards, and when we look at the old ones, it may be considered remarkable if some of them revive at all.

These, then, should be replanted in the near future, the cost of such operation being, we will say, roughly £30 per acre to bring them into bearing. The grower, however, has no guarantee that, just as these new vines are well established, his vineyard will not be obliterated by disease, and it is not to be wondered at that those in the industry are not inclined to extend their areas appreciably.

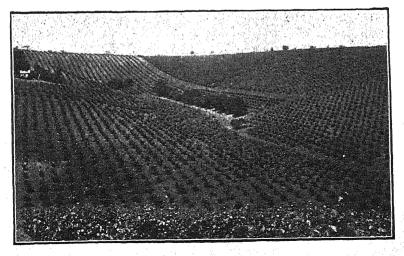
We have at the present time the example of one of our leading wine firms preparing to sink tens of thousands of pounds in establishing vineyards on resistant stocks in Victoria, simply because there is no insurance upon their capital invested in South Australia. They realise that phylloxera in this State spells ruin to their business, which has only been built up in a lifetime, but even now, could they see a reasonable guarantee of security, they would very considerably

increase their local area and allow the other idea to remain in abeyance.

It is authoritatively admitted that, with careful sterilisation, cuttings could be introduced with practically no danger of introducing the insect, and a clean mother vineyard could be established from these. Planted in an isolated area, the resistant vines could be easily proved as clean, in which case their presence within the State is not going to spontaneously induce an outbreak of phylloxera.

Once certified as clean, these stocks could be experimented with, and if at a later stage there should occur, as would seem only probable, an outbreak of the disease, they are not going to hasten the inevitable result, but rather to prove a very solid factor in supporting the vine-growing industry of this State. Replanting would be automatically carried out before the growers had become disheartened by a hopeless fight and loss of capital involved.

In concluding this report, I would express my firm conviction that the points raised are worthy of careful consideration by the Phylloxera Board. This Board has upwards of £10,000 at its disposal, and if the Association of Vinegrowers think fit, and the Board concurs in the opinion, part of this fund should be appropriated to make provision upon the lines indicated.



Vineyards, Near Adelaide.

THE WHEAT MARKET.

LONDON (Previous Day). Date. July 2 Steady, no quotation. 3 Unchanged; Liverpool market firm but quiet. õ Rather quieter. Very weak, 6d. to 9d. lower; Liverpool market very dull, and lower to sell. Unchanged, no demand. Steady, no quotation. Firmer; Liverpool market quiet. Quiet; Liverpool market steadily held, but not active. 10 13 Firm, and 3d. to 6d. dearer. Rather dearer; Liverpool market sellers asking 3d. to 6d. advance. 15 Very firm, and 6d. to 1s. advance asked. 16 17 Steady. 20 Quiet. 21 Firm, and 3d. to 6d. dearer. Dull, and offered lower; Liverpool market quiet. 23 Unchanged. 24 Steady but quiet. 27 Rather dearer; Liverpool market very firm. Unchanged; Liverpool market firm and dearer. 29Steady, no quotation; Liverpool market firm but quiet. 30 Easier, no demand. Quiet.

South Australian prices during the month have remained at from 7s. 6d. to 7s. 9d. per bushel for ordinary f.a.q. on trucks, Ports Adelaide, Pirie, and Wallaroo. Little has been done with parcels, which are quoted at about 8s. on trucks, Port Adelaide.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on 2nd August:-

BUTTER.—A further substantial increase in supplies of butter was recorded during the month of July, and the State is almost self-supplying. Prices have advanced even further, in top grades about a half-penny, while store and collectors' improved quite 2d. per lb. "Alfa" reached 2s.14d.; "Primus," 2s. 1d.; choice separators and dairies, 1s. 11d. to 2s.; store and collectors', 1s. 9d. to 1s. 10d. per lb.

EGGS.—The seasonable easing has taken place in this line, although supplies are nothing like so bounteous as they were this time last year, and rates in consequence maintain comparatively high, the month closing with hen, 1s. $3\frac{1}{2}$ d.; duck, 1s. $4\frac{1}{2}$ d. per dozen.

CHEESE continues to be very scarce indeed, and importations are reaching this market from New Zealand. Prices have advanced substantially to 1s. $2\frac{1}{2}d$. to 1s. $3\frac{1}{2}d$. per lb. for large to loaf.

BACON.—The State of New South Wales now prohibits the export of this line, and with local cure not equal to trade wants, rates are showing a firming tendency; sides, 1s. 1d. to 1s. 2d. per lb.; hams, 1s. 1d. to 1s. 2d. per lb.

Honey.—Very little is now offering, as it is late in the season, prime samples being worth $4\frac{1}{2}$ d. per lb.; beeswax, 1s. $5\frac{1}{2}$ d. per lb.

ALMONDS.—Only small quantities coming to hand, Brandis selling at 8d.; mixed softshells, 6½d. to 7d.; hardshells, 3½d.; kernels, 1s. 5½d. per lb.

LIVE POULTRY.—Consignors are wisely forwarding all their surplus, in view of the good figures that are now ruling, and although fair quantities have been marketed the demand readily absorbs all lots arriving, the difficulty being to secure sufficient for trade requirements. Good table roosters fetched 4s. 6d. to 4s. 11d. each; nice conditioned cockerels, 3s. 3d. to 4s.; plump hens, 2s. 6d. to 3s. 3d.; ducks, 3s. to 4s. 3d.; geese, 4s. 9d. to 5s. 6d.; pigeons, $7\frac{1}{2}$ d.; turkeys, from $9\frac{1}{2}$ d. to $11\frac{1}{2}$ d. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—Large quantities of potatoes have been imported from Victoria, but high prices have had the effect of considerably reducing consumption, and owing to the accumulation of stocks the Adelaide market has become lifeless. Onions.—Fair supplies of very prime samples have been obtained from local sources, and a few trucks have been imported from Victoria. Quotations—Potatoes, £11 per ton of 2,240lbs. on trucks Mile End or Port Adelaide; onions, £10 to £11 per ton of 2,240lbs. on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of July, 1915, also the average precipitation to the end of July, and the average annual rainfall.

A A									
Station.	For July, 1915.	To end July, 1915.	Av'ge. to end July.	Av'ge. Annual Rainfall	Station.	For July, 1915.	To end July, 1915.	Av'ge. to end July.	Av'ge. Annual Rainfall
FAR NORTH	and [JPPER 1	Vorth.		Lower N	ORTH-	continu	ed.	,
Oodnadatta	0.02	1.06	3.20	4.76	Spalding				1.90.95
Tarcoola	0.08	1.43	4.26	7.58	Gulnare	1.69 1.35	11.67	11.10	20.25
Hergott	0.27	1.63	3.75	6.04	BundalcerW.Wks.		10.95	4	
Farina	0.05	1.98	4.20	6.70	Yacka	1.57 1.34	10.13	9.39	17.29
Leigh's Creek	0.07	1.37	5.39	8.66	Koolunga		8.09	8.77	15.27
Beltana	0.63	2.97	5.67	9.22		1.61	7.61	9.27	15 94
Blinman	0.86	4.30	8.09	12.85	Snowtown	1.79	9.11	9.25	15.70
Hookina	0.96	6.07			Brinkworth	1.88	8.79	8.87	15.48
Hawker	1.58	6.39	7.14	12.22	Blyth	1.46	9.27	9.58	16.34
Wilson	1.06	5.58	7.07	11.78	Clare	2.51	13.79	14.24	24.30
Gordon	0.90	4.09	5.89	10.26	Mintaro Central .	2.22	16.00	12.36	21.99
Quorn	1.40	6.41	7.90	13.78	Watervale	2.06	15.23	15.69	27.17
Port Augusta	0.77	4.31	5.59	9.46	Auburn	1.83	13.47	14.16	24.25
Port Augusta W.	0.91	4.59	5.30	9.36	Hoyleton	1.45	8.73	10.46	17.96
	0.88	5.08	5.78	10.01	Balaklava	1.21	8.56	9.38	16.03
Bruce	1.17	4.65	1 .	11.46	Port Wakefield	1.27	7.08	8.19	13.13
	2.52		6.51	18.26	Terowie	1.23	5.75	8.47	13.71
Wilmington		10.20	10.64		Yarcowie	1.55	6.63	7.80	13.91
Willowie	1.42	6.13	6.90	11.90	Hallett	1.22	8.90	9.01	16.40
Melrose	3.12	12.70	13.86	23.04	Mount Bryan	1.23	10.09	8.84	15.73
Booleroo Centre	1.23	6.77	9.01	15.83	Burra	1.73	11.19	10.27	17.82
Port Germein	1.41	7.54	7.52	12.84	Farrell's Flat	1.57	10.68	10.86	18-87
Wirrabara	3.56	12.82	11.09	18.91		1		•	٠,
Appila	1.61	7.01	8.55	15.08	West of	MURRA	Y RAN	GE.	
Cradock	1.02	4.89	6.36	10.86					1 10.00
Carrieton	2.00	6.07	6.94	12.22	Manoora	1.31	10.33		18-09
Johnburg	1.06	3.92	5.64	10.21	Saddleworth	1.77	13.34	11.49	19-69
Eurelia	1.90	6.83	7.42	13.24	Marrabel	2.45	12.52	10.81	
Orroroo	1.71	6.01	7.89	13.42	Riverton	1.76	14.20	11.84	20.48
Black Rock	1.67	5.73	7.05	12.25	Tarlee	1.94	13.83	9.96	17.48
Petersburg	1.44	6.52	7.25	13.07	Stockport	1.78		9.01	15.89
Yongala	1.98	8.12	7.59	13.94	Hamley Bridge	1.60	11.95	9.51	16.45
	•		•	-	Kapunda	1.71	12.65	11.38	19.67
I	North-	East.			Freeling	1.58	11.40	10.16	17.85
Ucolta	1.27	4.48	Manage .		Greenock	1.98	13.99	12.03	21.46
Nackara	1.09	5.16			Truro	1.65	12.77	11.20	19-74
Yunta	0.38	2.47	4.79	8.22	Stockwell	1.52	13.28	11.48	20.30
Waukaringa	0.53	3.07	4.65	7.94	Nuriootpa	1.65	12.45	12.08	21.25
Mannahill	0.65	2.15	4.86	8.46	Angaston	2.01	15.56	12.60	22-25
Cockburn	0.49	2.04	4.87	7.97	Tanunda	1.85	14.23	12.91	22.28
Broken Hill, NSW	0.85			9.63	Lyndoch	2.53	15.31	13.46	23.01
Lo	OWER N	ORTH.			ADEL	aide P	LAINS.		•
Port Pirie	1.67	8.30	8.88	13.21	Mallala	1.63	9.75	9-91	1 16.88
Port Broughton .	1.89	8.55	8.61	14.33	Roseworthy	1.67	11.95	10.05	17.31
Bute	2.09	8.68	9.36	15:42	Gawler	1.78	12.66	11.36	19.21
Laura	2.26	10 15	10.34	18.22	Two Wells	1.52	8.46	9.97	16.36
Caltowie	2.18	8.12	9.48	17.27	Virginia	1.87	10.52	10.52	17.58
Jamestown	2.43	10.04	9.62	17.46	Smithfield	1.66	11.56	10.13	17.30
Gladstone	1.80	8.87	8.96	16.00		2.15	11.15	11.17	18.57
Crystal Brook	2.03	8.34	8.97	15.62	Salisbury North Adelaide	2.62	13.25	12.96	21.49
Georgetown	1.84	9.47	10.53	18.32	Adelaide	2.73	12.22	12.76	21.04
Narridy	1.65	9.81	8.63	16.79		2.82	13.15	12.01	19.93
Redhill	2.08	7.99	10.85	16.79	Brighton	2.28	12.34	11.20	18.35
AMOUNTED STREET	2.00	1.99	10.00	10.19	Glenelg	4.28	14.04	11.20	10.00
-	<u> </u>	1	1	1		1	1		
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RAINFALL-continued.

			TATI	NEALL	-commuea.				
Station.	For July, 1915.	To end July, 1915.	Av'ge, to end July.	Av'ge. Annual Rainfall	Station.	For July, 1915.	To end July, 1915.	Av'ge. to end July.	Av'ge. Annual Rainfall
Adelaide	PLAINS	s—conti	nued.		West of Spen	CER'S	Gule-c	continue	ed.
Magill	3.52			25.69	Streaky Bay	3.02			
Glen Osmond	3.95	17.62	15.34	25.20	Port Elliston	3.02	7.48	9.99	15.31
Mitcham	3.34	16.90	14.37	23.47	Port Lincoln	3.49	9·19 11·81	10.63 12.42	16·49 19·88
Belair		18.07			Tumby	2.15	7.58	9.20	15.00
201011 1111111111	1 000	100.	1 00	1 20 01	Carrow	2.44	8.36	9.20	19.00
Mount	LOwny	RANG	P.C		Cowell	1.32	9.33	7.05	11.76
				1 00 70	Point Lowly	1.27	6.35	6.93	
Teatree Gully	2.88	17.12	17.11	28.19		1	0 55	0.00	12 21
Stirling West	6.75	33.25	28.07	46.70					
Uraidla	6.57	34.92	26.88	44.35	Yorki	e's Per	NINSULA		
Clarendon	3.59	18.05	20.24	33.67	Wallaroo	1 100	0.10	900	1140=
Morphett Vale	3.02	12.73	14.04 12.42	$\begin{vmatrix} 23.32 \\ 20.28 \end{vmatrix}$	Kadina	1.90	8.13	8.83	14.05
Noarlunga	2.96	12.79	15.80	25.98	Moonta	1.88	9-29	9.95	15.88
Willunga		11.83 10.57	12.44	20.34	Green's Plains	2.12	9.40	9.65	15.22
Aldinga	3.54	11.69	12.83	20.65	Maitland	1.76 2.37	9.54	9.58 12.30	15·73 20·08
Normanville Yankalilla	4.16	13.74	14.45	22.78	Ardrossan	1.45	8.96	8.40	13.89
	2.66	6.08	10.41	16.34	Port Victoria	2.26	10.07	9.49	15.20
Cape Jervis Mount Pleasant .	2.48	16.75	15.84	26.87	Curramulka	3.28	12.72	11.13	18.51
	2.79	17.20	17.45	29.38	Minlaton	3.13	13.28	10.56	17.41
Blumberg Gumeracha	3.26	20.26	19.45	33.30	Stansbury	2.81	10-95	10.31	17.06
Lobethal	3.93	23.34	20.93	35.38	Warooka	2.62	10.10	10.90	17.71
Woodside	3.35	22.23	18.56	31.87	Yorketown	2.35	9.27	10.53	17.47
Hahndorf	3.88	18.76	20.64	35.45	Edithburgh	2.63	10.45	10.10	16.48
Nairne	3.03	17.66	16.95	28.83		, - 00	1	1	,
Mount Barker	3.26	19.84	18.13	30.93					
Echunga	3.18	20.93	19.58	32.83	SOUTH A	ND SOU	JTH-EAS	ST.	
Macclesfield	2.97	18.55	17.76	30.72	Com Paula	1 - 70	1 7 7 00		10=00
Meadows	4.87	25.29	20.90	35.52	Cape Borda	5.19	15.00		
Strathalbyn	2.00	10.95	11.40	19.28	Kingscote	3.45	9.72	11.94	
		1			Penneshaw Cape Willoughby.	2.86	9.54	13.44	21·34 19·69
Murray	FLATS	and V	LLEY.		Victor Harbor	3.07	11.63	13.57	22-18
Wellington	1.56	8.17	8.70	15.01	Port Elliot	2.49	8.07	12.26	
Milang	1.67	6.82	9.86	16.08	Goolwa	2.08	9.06	10.85	
Langhorne's Brdg	1.30	6.06	8.89	15.27	Pinnaroo	0.98	6.80	9.29	16.74
Tailem Bend	1.40	7.16			Parilla	0.78	6.63	-	70.22
Murray Bridge	0.88	5.87	8.36	14.32	Lameroo	0.85	7.25	9.19	16.55
Callington	1.40	7.59	9.16	15.65	Parrakie	1.04	7.41		
Mannum	0.64	4.87	7.00	11.67	Geranium	1.03	7.84	_	
Palmer	1.03	7.66	8.73	15.60	Peake	1.16	7.31	8.45	14.74
Sedan	0.89	6.40	6.97	11.92	Cooke's Plains	1·39 2·11	8·23 6·43	11.28	
Blanchetown	0.60	3.62	6.20	10.71	Meningie	1.10	1	10.16	
Eudunda	1.71	10.14	9.88	17.33	Coonalpyn	1.59		10.10	
Sutherlands	0.97	5.54	5.92		Keith	1.56		10.04	10.10
Morgan	0.84	3.89	5.08	9.29	Bordertown	1.16		11.09	19.76
Overland Corner .	0.72	2.58	6.36		Wolseley	1.19			
Renmark	0.84	3.76	6.76	10.93	Frances	1.64			
Loxton	0.87	4.68	1 —		Naracoorte	1.77		1	
					Penola	2.73		1	
WEST OF	F SPEN	œr's G	ULF.		Lucindale	3.03			
Eucla	1 0.55	6.00	6.64	10.13	Kingston	3.42			
White Well	0.47		5.58		Robe	1			
Fowler's Bay	1.92		8.15		Beachport	3.42			
Penong	1.34				Millicent	4.25			
Murat Bay	1.39		.1		Mount Gambier .	4.84	19.82	18.50	32.00
Smoky Bay	1 93		_		C. Nrthumberland	4.88	15.54	16.06	3 26.63
			1						

THE AGRICULTURAL BUREAU.

CONFERENCE OF PINNAROO AND BROWN'S WELL DISTRICT BRANCHES.

The Annual Conference of the Branches of the Agricultural Bureau in the Pinnaroo and Brown's Well District was held at Tailem Bend on Thursday, July 22nd. The Department of Agriculture was represented by the Director of Agriculture (Professor A. J. Perkins), Messrs. F. E. Place (Veterinary Lecturer), F. Coleman and J. Miller (members of the Advisory Board), and G. G. Nicholls, Secretary. The following gentlemen attended as delegates from the undermentioned Branches:-Bookpurnong East-Messrs. K. O. Schulze, F. McMillan; Sherlock—T. Partridge, H. II. Platten; Pinnaroo—P. J. Edwards, P. H. Jones; Coomandook—R. Upton, H. Marsh, C. Driscoll; Coonalpyn-F. J. Tregenza, G. H. Wall; Parrakie—A. J. Beelitz, H. Diener; Parilla Well—E. H. Leak; Mindarie—W. P. McCabe; Parilla—M. Shannon, G. E. Gregory; Claypan Bore—D. P. McCormack, H. Colwill; Tatiara—T. Stanton, A. A. Fisher; Geranium—F. Norton, W. A. Stacey; Wilkawatt—D. F. Bowman, E. W. Brooker; Mantung—A. E. Tonkin; Wynarka—S. G. Williams, A. Hood, C. W. Schultz; Lameroo-W. Needs, S. G. Trowbridge; Halidon-W. D. Clark. The chair was occupied by Mr. J. R. Beck, of the Wynarka Branch, who extended a hearty welcome to the visitors.

OPENING ADDRESS.

Professor A. J. Perkins, Director of Agriculture, in opening the proceedings, apologised for the absence of the Minister of Agriculture, the Hon. C. Goode, whose parliamentary duties prevented his attendance. He congratulated the members of the farming community on the favorable prospects for the coming harvest, particularly after the unfortunate experiences of the recent season. There appeared to be every possibility that they would reap a record crop. There was some doubt in regard to the price which would be secured for the wheat from the coming harvest; however, it seemed to him to be very likely that the ruling rate would be much higher than was anticipated by some. The carriage of the wheat overseas would probably present some difficulties, but he hoped that the problems would

be solved in a satisfactory manner. It was unlikely that wheat would be bought for much under 5s. a bushel. He proceeded to refer to a few points relating to the experiences of the past season, particularly to the districts represented by those present. The successful farmer was the man who was able to gauge the average conditions obtaining in his district, and who planned his work on those lines. There were several weak points in their practice to which attention might be directed. There was no doubt that the shortage of foodstuff materials for livestock had been very considerable. No farmer could be expected to make provision for several years' needs, but a certain shortage could be anticipated, and better provision made to meet it than was generally done. should be cut and more chaff used, and there were other means which could be resorted to. The practice of feeding hav to livestock was becoming almost inborn in the farmer, and no matter at what price hav could be bought, it was always used. Other forms of feed could be used at much less cost. This applied particularly to the feeding of working horses and cattle in dairying districts. More concentrated foodstuffs should be provided; they were far less expensive and productive of better results. In certain districts several fodder crops could be grown with advantage. In their country the land was hardly cleared, and the position was somewhat difficult. When normal farming conditions were arrived at it would be an advantage to fall back upon forage crops suitable for the district. The times of the year when feed was particularly scarce were the end of autumn and the early winter months. With good general rains in April, early winter feed could be readily grown-such crops as rape, barley, and rye. In the majority of cases, however, the autumn rains could not be depended upon. This was where the difficulty arose, as the growth was not always satisfactory. A solution of this was the utilisation of water, where underground supplies were available. In many districts, more particularly on the Pinnaroo line, the underground water was good from the point of view of irrigation, not essentially for summer production, but more for autumn production. These forage crops would enable farmers to tide over several months of feed scarcity. This had been done in some instances with a great deal of success, and it would be satisfactory if the practice could be extended. Sorghum sown late in the season, say, in mid-January, would come into head in March, and could be left standing right through the winter, or cut whenever required. Very little moisture was required to keep it growing; watered two or three times during the growing sea-Rape, peas, barley, or oats son a very useful crop could be secured. would be sown later, say, early in April. They would be used for

Lucerne, in the north, was grazing or cutting fairly early in winter. very satisfactory when sown in a hay crop and utilised subsequently for grazing for two or three years. In lighter types of soil, also, it should prove successful. Sheep, cattle, and possibly pigs could be combined with an ordinary rotation of grazing crops. Pioneering difficulties had to be overcome, but possibly matters could be hastened somewhat, as too great a length of time was sometimes occupied in getting the land into working order. Stumps left in the ground caused trouble in working, and also caused injury to implements. It would be wise to limit operations and thoroughly conquer whatever land was cleared. As soon as they passed the early stages of farming their occupation would become brighter and more profitable. During the past season the Department had to work under considerable difficulties outside the ordinary scope of their work. The Minister had expressed a wish to go right through the district and see whether the Department could not do more for them in the future, and arrange for experimental work to be carried out in conjunction with what was being done at Veitch's Well.

It was difficult for the officers of the department to give advice until they had the advantage of experience in growing crops under the conditions obtaining in the district.

FALLOWING.

The following paper, written by Mr. C. A. Russell, of the Halidon Branch, was read by Mr. W. F. D. Clarke, of the same branch. Mr. Clarke apologised for the absence of Mr. Russell, who had enlisted with the Expeditionary Forces. "The popularity of the practice of fallowing is becoming more evident every year, throughout the drier areas of This is clearly shown by the following statistical data:— Going as far back as 1898, we find that the area under bare fallow was 734,600 acres, whilst the total area under cereals was 2,147,000 acres, That is, for every 1,000 acres under crop there were approximately. 342 acres under bare fallow. This is in marked contrast to the areas left out in later years, taking 1910-11 for example, when, for every 1,000 acres under cereals there were 505 acres left out as bare fallow, the total figures being 1,369,000 acres under bare fallow, and 2,711,000 acres under cereals. It will also be noticed that whilst the area under cereals only increased by 25 per cent., the area left out as bare fallow increased nearly 50 per cent. During later years half the crops in the State have been sown on land left out as bare fallow.

"Although the practice of fallowing has become so popular and widespread throughout the State, it must not be thought that it is without its disadvantages; and it is by comparing the disadvantages with the advantages that we may decide whether it is advisable to continue the practice year after year.

"Taking the disadvantages first, we find that we are losing the use of the land for 12 months. This, however, need only be considered where holdings are comparatively small, and land values high. Secondly, the organic matter supply is being depleted, and consequently other methods are needed to return organic matter to the soil, and make it available as plant food. There are several ways of doing this, and the one that probably is most suitable to large areas is leaving the land for pasture, when the droppings of livestock will help to replenish the supply of organic matter. These are the two main disadvantages, but the advantages are far greater.

"Firstly, by fallowing, we have, at seeding time, a much better seed bed prepared than could otherwise be obtained by ploughing just previous to seeding, as at this period of the year the land has mostly to be worked in a dry state, and consequently the seed bed is left loose and open; whereas, if fallowing is resorted to, we are able to plough the land during the wet months of the year, and consolidate the seed bed by subsequent tillage.

"Fallowing allows us to plough the land deeply, thus ensuring a more thorough aeration. One of the most important factors of fertility is the permeability of soil to air and water, and this can only be brought about by deep cultivation. Another advantage of fallowing is that it allows time for weed seeds to germinate, and subse-Then, of course, there is quently to be exterminated before seeding. more moisture retained in the soil, which proves of great benefit to the wheat plant in the earlier stages of its growth. Fallowing is also favorable to the growth of nitrogen gathering bacteria, that is, if the fand is properly tilled, and there is an adequate supply of organic So that, by fallowing land year after year, we must be using up a vast amount of organic matter, and some means, as previously stated, must be found to restore this organic matter to the soil.

"On land intended to be left out as fallow, one should start ploughing as soon after seeding as possible—that will be about the middle of June, or perhaps a little later. Early fallow invariably proves the best, and especially is this the case with the lighter soil. I advise first starting in the sand, so that it will be consolidated by the heavy winter rains in July. This is most important, because sand left loose and open is very unfavorable to the growth of cereals. The heavier land will be left till last, because it is easier to work that down to a fine tilth than to consolidate the sand. I would use a plough cutting a 7in. furrow, and plough to a depth of $3\frac{1}{2}$ in. or 4in. That is for early fallow, but if we

have to plough dry and late, it would not be advisable to plough so deeply. I would set the draught to plough out as many stumps as possible, as one is allowed ample time to pick them up before seeding, and also it means all the more moisture left in the soil.

"During the winter months I would leave the land in a rough state, the rougher the better, as it allows the rain to penetrate more easily, and it will also be open to the action of the air. The subsequent working of the fallow should begin in September, when the harrows should be used as near as possible after every rain. A tine cultivator should be used for loosening the surface, and thus conserving moisture and sweetening the soil. One of the main objects of using the cultivator is the eradication of weeds, which will most probably be plentiful at this period of the year. After the spring working of the fallow it should be left idle until seeding time or the first autumn rains have Then the cultivator could once more be germinated the weed seeds. effectively used. Summer working is sometimes practised where weeds Then the cultivator is used on warm days when the are plentiful. weeds will be more easily killed.

"It is impossible, however, to lay down any hard and fast rule as regards the after tillage of fallow, as it will vary considerably with the condition of the soil. Stubble should be occasionally left on land intended for fallow, that is if the land has been well sweetened by a couple of stubble burns previously. The stubble could then be ploughed in, and thus help to replenish the supply of organic matter. To sum up, the working of the fallow should tend to these four main objects:—

- 1. Consolidation of the seed bed.
- 2. Aeration of the soil.
- 3. Conservation of moisture.
- 4. Eradication of foreign plant growth."

Mr. D. P. McCormack (Claypan Bore Branch) thought burning of stubble was preferable to ploughing it in, as it enriched the soil, and killed the shoots.

Mr. F. Norton (Geranium Branch) referred to the difficulty which was experienced in burying the stubble properly when ploughing in. His experience led him to the opinion that, provided the land was kept clear of weeds, the less cultivation it received the better. Sheep were to be recommended for packing the soil and keeping it free from weeds, and this was to be preferred to continual cultivation. In normal seasons weeds gave a good deal of trouble, and sheep would solve the problems of consolidation and keeping the land clean.

Professor Perkins said there was a tendency to overwork light land. The essential was to get the land opened up, pul-

verise the surface, and pack it down. Light land should only be worked when in wet condition. In regard to the difficulty with weeds, the drawback of sheep was that they would not eat some weeds. Experience was the best guide in regard to burning; it had to be resorted to in the early stages, but one or two burnings should be ample to sweeten the ground. The only reason for burning then would be for the destruction of shoots. Fire tended to destroy the organic matter that had been accumulating in the soil, and which would be required in the future. When there was a heavy crop of stubble, stock should be turned in to trample it down, and the rain would then soon cause its decay.

GREEN FEED: ITS ADVANTAGES AND DANGERS.

The Veterinary Lecturer, Mr. F. E. Place, B.V.Sc., M.R.C.V.S., delivered an address on this subject. He said the advantages of green feed were many, and the dangers few. There were three classes of animals which formed the stock of the country-horses, cattle, and sheep; and in each case it was necessary to provide green feed for their special requirements. Green feed was the natural feed as soon as the animals were weaned from milk, and the internal organs rapidly adapted themselves to obtain far more nourishment from it than from grain or hay, and the strain placed upon the digestive organs was very much less. If feed was in excess of requirements, scouring would rid them of the excess. In conserving fodders they were bound to lose constituents which played an important part in the upbuilding of tissues. Young stock often made selections of plants at certain stages of growth. The reason was that Nature was instructing them as to the most beneficial food for Many troubles were caused through lack of green their needs. feed. In the case of the horse, green feed was required to fill the large bowels, in which the feed stayed for a considerable time. hard, stony condition of the bowels was caused by feeding material which injured the organs. That and a train of other troubles could be avoided by supplying green feed. The provision of a very small area would be a better investment than a medicine chest. In the case of cattle, the feeding of concentrates became almost harmful in The same thing applied also to sheep. Parasites, such as time. bloodworms, were more quickly removed by green feed than by medicine; also long round worms and whip worms could not withstand the results of feeding green stuff. This applied more particularly to sheep.

DANGERS.

When the involuntary muscular system of the digestive tract had been struggling to digest dry feed and was suddenly called upon Too rapid ferto deal with more digestible food, trouble resulted. mentation and distension of large bowels resulted. It was possible to founder horses with green feed. The sudden change in the regulation of the processes of digestion was more than the constitution could stand, and the feet showed the effect first. In changing the diet of a horse a few days should elapse before the complete change If this were observed, trouble would be avoided. When distension of the large bowels took place, the horse should be dosed with baking soda or ammonia to reduce the gases to lesser bulk. In the case of the cow a tremendous swelling of the stomach resulted, a condition which was termed "blown." Resort could be made to the use of either the trocar and canular or a knife. The knife should be jabbed into the paunch on the left-hand side, at the point of highest swelling; it should be given a half-turn, and left in the side until the bulk of the gas had escaped. A simpler method was to put a round piece of stick in the cow's mouth, like a bit, to keep the jaws well apart, and secure the ends of the stick by tying round the horns with string. The cow should then be forced, by the aid of a dog or otherwise, to take vigorous exercise. This caused the escape of the gas through the mouth. Sheep often became limp when put suddenly on to wet green feed. Rapidly growing green feed produced inside the animals glucosides, compounds which in rapid disintegration became harmless sugars, but when the process was checked, poisonous gases were formed. Cress or spurious buckbush fed to hungry cattle caused this trouble. To avoid it a feed of chaff should be given to the cattle before turning them out. Tired stock were incapable of digesting green feed.

PLACE OF NEXT CONFERENCE.

Proposals were made to hold the 1916 conference at Pinnaroo, Parrakie, Bordertown, Murray Bridge, and Tailem Bend. By a large majority it was decided to hold the fixture at Tailem Bend during the month of July. The Coomandook Branch was invited to make the arrangements.

SHOOT SCORCHER.

Mr. R. Upton (Coomandook Branch) initiated a discussion on the question of recommending the Government to offer a bonus for the manufacture of an efficient shoot scorcher. He explained that a machine had been used in their district, and he believed it might be

regarded as the germ of what should at some future date become a very useful implement. One of the most serious difficulties which faced scrub farmers was the conquest of mallee shoots. Stubble burns were often far from satisfactory. With the aid of such an implement as he had mentioned a good burn could be secured at any time, and the farmer would be greatly assisted in his operations. The machine he had in mind was 6ft. in width, and required four horses to work it. A lighter type of machine would be effective. Mr. H. Marsh (Coomandook Branch) said that the mallee shoots were destroyed in two operations of the implement, which was capable of covering 10 acres of ground per day.

- Mr. G. G. Nicholls (Secretary to the Advisory Board of Agriculture) said that he had seen the implement at work, and explained the *modus operandi*. The question to be settled was whether the need for such a machine existed. If so, it remained for the branches to recommend the Advisory Board to influence the Government in the direction of offering a bonus to encourage the perfection of the machine. Messrs. F. Norton (Geranium), T. Partridge (Sherlock), F. J. Tregenza (Coonalpyn), and D. P. McCormack (Claypan Bore) supported the movement to encourage the production of a satisfactory machine.
- Mr. J. Miller (member of the Advisory Board) said that the effective eradication of mallee shoots was one of the greatest problems they had to deal with in scrub country, and he would certainly support any proposal to secure a bonus for a machine which was likely to help in the solution of the shoot difficulty.
- Mr. F. Coleman (Chairman Advisory Board) said he was satisfied there was room for such a machine, and he would give his entire support to the movement.

QUESTIONS.

Professor Perkins answered a number of questions put to him by the delegates present.

In regard to the education of lads in farm operations, Professor Perkins said that the Government farms, wherever circumstances permitted, accepted a limited number of youths with the idea of teaching them the rudiments of farming.

Experimental Plots.—In regard to the selection of land for experimental purposes, the endeavor of the Department was to solve any problems which were brought under the notice of its officers. For this purpose the land selected might be good or possibly poor land.

Take-all was not influenced by the quantity of superphosphate applied to land.

Topdressing of Crops.—Any fertiliser used for this purpose required to be very soluble in water. Superphosphate was not suitable, and if a sufficient quantity were sown with the seed there was no necessity for subsequent applications. Nitrate of soda and sulphate of ammonia were suitable fertilisers for the purpose, but he was doubtful whether they would be required on their country.

Harrowing after Rolling.—For a wheat crop this was to be recommended.

Crop to follow Barley.—The Professor recommended leaving the ground out for grazing after a barley crop, as good feed always sprung up in barley stubble. If eropping was desired, a leguminous crop, such as peas, should be sown. Japanese millet should be sown at the rate of a couple of pounds of seed to the acre. The seed should be mixed with bonedust, ½cwt. to the acre.

Farmyard Manure for Fruit Trees.—Fresh farmyard manure should not be used. Well-rotted manure sometimes caused the development of a root fungus.

Lucerne Growing.—Where lucerne would grow tolerably well, it was good practice to sow it in a portion of the hay crop, say 20 acres. With the assistance of summer rains this would provide good feed. About 6lbs. to the acre should be broadcasted and rolled in.

WHEAT IMPROVEMENT.

Mr. F. Coleman (Chairman of the Advisory Board of Agriculture) delivered a paper on "Wheat Improvement." He said—

AGRICULTURAL PROGRESS.

The first era in a new country's development is pastoral; as improvements are effected and small areas with water conservation become practicable, the plough comes into use. And no crop is more largely cultivated throughout the British Empire among white people than wheat. Australian development has been in line with this policy. The pastoral development has been succeeded by that of the agricultural. Wheat constitutes 60 per cent. of our Australian crops, for no crop is better adapted to climatic and other conditions, such as thin population, than wheat; nor is much skill required in the production of an average crop, given favorable weather conditions; but the highest skill, ability, and intelligence is called into play to obtain maximum crops.

WHEAT.

Our wheat has probably been developed from a grain-bearing grass found in Palestine. The variety most commonly cultivated in Australia—Triticum Sativum Vulgare—is in itself almost a perfect

food, and hence the crop becomes the most important food production for the white races of the world. In the hotter, drier districts in the north of Africa another variety of the wheat plant, the Durum These are better drought resisters, are rich in wheats, is grown. gluten, but poor in starch, with a sweet straw, making them valuable as hay wheats. The wheats of Western Canada, in the United States. make a large loaf; those of Oregon, England, and Australia vield the whitest flour: a mixture between Western Canada or Manitoban and English wheats make sweetest bread. Australian wheats are valued for the excellent color of their flour, and hence are used for blending with the stronger European varieties, the flour from which requires leaching in order to produce a good white loaf. Our wheats, however, are weak in strength, but improvements in milling appliances have induced the English millers to leave to the growers the question of varieties best suited to their conditions. For us this means a straight grade wheat—that is, one which alone will produce an excellent loaf of bread.

IMPROVEMENT IN WHEAT.

While animals have been improved by breeding for some 2,000 years, the improvement in plants, and in wheats particularly, is only of comparatively recent date. In animals improvement has produced Shorthorn and Jersey cattle, the draught and trotting horses, the Merino and English breeds of sheep, the White Leghorn Orpington fowls, as typical examples known to all of us. breed like animals, and the possibilities of improvement in varieties of wheat suited to various conditions, climate, and soil are as great as in the animal world. Hays, in America, has found the need to breed wheats for different parts of Minnesota, hence the probability that our different districts in South Australia may require different varieties to give the maximum returns; indeed, we have already found it so. Federation, the most popular wheat in Australia to-day, appears to be unsuitable to our lighter mallee soils, where, however, such wheats as Kings, Gluyas, and Carmichael appear to give better results.

VARIATION.

All through nature there is an inherent tendency to vary. While an enormous majority may only vary in an infinitesimal degree from the mean of the lot, there will be a few that are distinctly better, and a few undoubtedly worse. This applies to wheat as to live stock. To maintain a high standard we need to eliminate the inferior; to improve the standard we must select and breed from that strain or characteristic we wish to become fixed and permanent, hence the need for selection of the best in raising our seed wheats.

While there are no two people exactly alike, so there are no two wheat plants exactly alike. It is not as easy as one reight imagine it to be to pick out of a paddock two wheat plants with equal number of heads, apparently equally well grown in every particular; but if this is done, and on thrashing out the grain and cleaning it, we find the same number of grains to each plant, a closer examination will almost certainly show a slight difference in color, size, shape, or appearance.

SELECTION.

This is the surest and most powerful means of improving wheat. In Canada the yield of the crop has ranged from 39 bushels to 46. France has gained much from sowing larger seed. Cobb, of New South Wales, after testing twenty-four varieties, was convinced of the advantage of grading and sowing the best seed. grading machines on the market, but while mass selection is of advantage in the removal of cracked, broken, and immatured grains. also of weed seeds, and in this way avoids waste and helps towards a cleaner crop, yet purity of type in the crop will not thus be obtained. Little seems to have been done in the way of selection of wheat till a Scotch farmer, Shiereff, began this work in 1819, though Virgil, the Latin poet, born 70 B.C., said that unless the larger grains were selected the wheat would degenerate. Hallett, in 1857, from an ear of wheat 43 in. long, containing 47 grains, obtained in four yearsthat is, in 1861—a head 83in. long, with 123 grains in the single ear and 52 ears on the plant. At Minnesota between 1895-98 a wheat-No. 169—gave an average of 284 bush., while the unselected parent stock yielded only 22½ bush. per acre. In Victoria the Selected Federation has given over 43bush, per acre, compared with 341 from the ordinary strain. Hallett in five years doubled the length of the head, increased the number of grains three times, and the tillering of the plant fivefold. DeVries has pointed out that we get mutations, as he calls them, which breed true; from a four or five-leafed clover he obtained a six or seven-leafed clover-probably the only plant of that description ever known.

METHOD OF SELECTION.

Bearing in mind this tendency to variation or mutation in the wheat plant, we shall find that the method adopted by Hallett in 1857 is a most effective and reliable one to adopt. That was the repeated selection, year after year, of seed grain taken from the best plant. Thus, the produce from one grain sown last year is again sown this year, and in this way a stock of pure selected wheat of that variety is obtained. Starting with, say, a hundred grains selected

from the best plant we can find on the farm, we shall obtain from 1½ to 2lbs. of seed. This the next year should give about three-quarters of a bushel, which on nearly an acre the third year would give us enough to strip with the machine. It is well, however, to take two or three hundred grain lots the first year, each, of course, from a separate plant, to insure our getting the desired strain or quality.

There are several points to be considered. While the miller and the baker aim at color, gluten, and strength in the flour, the farmer requires a prolific rust-resistant, drought-resistant, reliable wheat to yield. It should be the aim of the grower of seed wheat to suit miller, baker, and farmer. He should select with regard to: (1) Suitability to the district; (2) yielding capacity; (3) retention of grain, yet not too tough to thrash; (4) freedom from disease; (5) resistance to drought; (6) quality of grain; (7) early maturity in drier districts; (8) stiff straw to carry the crop; (9) resistance to smut. One here and there doing this work will have an influence, but if the work of selection were carried out by a great many farmers over the State, the improvement would be marked, for an increase by selection of but one grain per head through the crop would mean an increase of half a million bushels per year over South Australia. in value about £100,000. Hallett increased from 47 grains to 123 grains.

RESULTS IN SOUTH AUSTRALIA.

Most of our best wheats grown in South Australia have been selected from conspicuous plants in the crops, such as Dart's Imperial, Marshall's No. 3, Gluyas, Carmichael's Eclipse, King's Early, Viking, Petatz Surprise, College Eclipse, Leak's Rustproof, Baroota Wonder, Steinwedel, and Correll's Le Huguenot. Many of these were selected in localities similar to yours here.

WORK IN OTHER COUNTRIES.

In United States of America, Minnesota improved the yield one-third bushel per acre. In Canada W. Saunders has produced Stanley Preston and Marquis Bishop. In England, Biffen has aimed towards yield and high flour strength combined with resistance to yellow rust. In Sweden the Grain Society of Svalof has fifteen trained specialists; with the help of a Government grant they have been able to send out large quantities of pure seed. In Germany there are sixty-four breeders of wheat, forty-six of barley, and fifty-three of oats. In India the Howards Puca are doing most excellent work in improving the Muzaffarnagar wheat, and in breeding other wheats of high strength and improved yield. In Australia the late

W. Farrer has added millions sterling to the value of Australian wheat crops. Dr. Cherry claimed that in 1909 alone £250,000 had been added to the Victorian crop as the result of Farrer's work. G. L. Sutton in Western Australia, Hugh Pye at Dookie, Victoria, J. T. Pridham at Cowra, New South Wales, as well as our local departmental officers, are all doing good work.

PRACTICAL METHOD OF SELECTION.

My plan has been to drill in one hundred grains in drills 21in. apart, each lot occupying exactly the same area of ground. The grains are placed in by hand about 3½in. apart, and then lightly covered by a rake. In this way every plant in a row can easily be seen, and the best plant selected. Each plot is carefully harvested, and except the hundred grains from the best plant, which is reserved for the stud plot the following season, the balance is sown through the ordinary drill out of the paddock, the adjoining hole on either side being left empty.

Mr. Coleman said the object of his address was to encourage the young farmers to take an interest in experimental work, and perhaps produce varieties of wheat which would be of value, not only to the district, but also to the State.

Mr. Coleman answered a number of questions put to him by members of his audience.

CO-OPERATION.

Mr. F. McMillan (Bookpurnong East Branch) read a paper on this A well organised system of commercial co-operation, he subject. said, would possibly be of value to those participating, but it would be necessary to protect the interests of those who did not belong to the body. Co-operation opened the way for the settler in scrub lands to overcome financial burdens which otherwise might become very heavy. As an illustration, he mentioned the case of one settler who gave his services for a period to a neighbor in return for the use of portion of the latter's plant. Co-operation of this nature could, under favorable circumstances, be made mutually profitable. general rule, two or three settlers living handy to one another would each make a periodical trip to the nearest township for stores, mail, A little arrangement, by which each in turn secured the requirements of the others, might effect a considerable saving in time, and work on the horses.

The suggestion that Branches of the Bureau should co-operate in the purchase of machinery, super., &c., would effect a saving in agents' commission, but this without allowing the Secretary any recompense for his work. The idea of a collective guarantee being given by the Branch for goods purchased might be practicable in older settled districts, but in newly-developed areas this was questionable. In his opinion the need for co-operation lay, not in purchasing of supplies, but in the marketing of produce. He advocated the pooling of the Australian wheat production, the earmarking of a certain portion for the Australian market at a fair price, and the export of the surplus; this to be done under Government regulation.

- Mr. F. Norton (Geranium Branch) thought a reduction in the prices of implements and other requisites could be effected by cooperative effort.
- Mr. D. P. McCormack (Claypan Bore Branch), supported the principle of co-operative working of farms. Farmers in new districts often burdened themselves with an excessive number of implements. It should be remembered that any co-operative bureau system would entail considerable additional work for the Secretaries of Branches.
- Mr. A. A. Fisher (Tatiara Branch), said that not only could cooperation effect a reduction in the prices of farmers' requirements, but a financial institution could be established which would enable farmers to be tided over times of stress.

On the motion of Mr. F. McMillan (Bookpurnong East), seconded by Mr. R. Upton (Coomandook), the discussion was adjourned until the occasion of the Annual Congress in September.

Mr. F. Norton (Geranium), proposed a vote of thanks, which was enthusiastically supported, to the Chairman, and delegates and departmental officers who had delivered addresses.

EXHIBITS.

A number of specimens of wheats, grasses, fodder plants, and vegetables were exhibited. Some of the wheat plants were over 2ft. in height, and the specimens generally testified to the high productive capacity of the districts represented.

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Coonalpyn	120			Mallala	102	2	6
Coonawarra	122			Mangalo	*		
Coorabie	103-10			Mannum	*	28	27
	95			Mantung	114-20		
Cradock				Meadows	122	24	21
Crystal Brook	‡			Maningia	*	28	25
Davenport	*			Meningie	+	14	11
Dawson	*			Milliang	*	10	14
Denial Bay	†			Millicent	1	21	18
Dowlingville		_		Miltalie	108	21	16
Elbow Hill	106	19	23	Mindarie	114	19	10
Forest Range	*		18	Minlaton	105		26
Forster	*	21		Mitchell	108	28	26
Frances	1	20	17	Monarto South	114	21	_
Freeling	*	-		Monteith	*	*****	
Gawler River	*	-	-	Moonta	104	-	-
Georgetown	.96	23	20	Moorlands	*		
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No report received during the month of July. + Formal report only received.
 ‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
August 11th and September 8th, 1915.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by H. J. FINNIS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82in.).

June 22nd.—Present: eight members and two visitors.

BLACKSMITH'S SHOP ON THE FARM .- Mr. Crisp read a paper on this subject. He said that a blacksmith's shop was practically a necessity on the farm. In erecting the shop plenty of room should be allowed for the bellows, forge, &c., and he suggested as a suitable size a room 14ft. by 18ft. by 9ft. or 10ft. high. It could be made of cheap material and proper provision should be made for lighting and ventilation. A forge and anvil were indispensable. The improved style of forge and blowers combined was cheaper and better than the old style, and took up much Tongs of various sizes, cold chisels, a drilling machine, and a set of taps and dies should also be available. For carpentering work, a saw, one or two planes, chisels, hammer and mallet, screws and nails of various sizes should be provided. Bolts of various sizes should also be kept on hand. Shelves could be made from kerosine cases and tins, and would serve to accommodate the various tools, &c. With a little practice, a farmer would soon find that he could carry out quite a lot of useful work, and the expense incurred in establishing the shop would Discussion followed, and several members said that they be amply justified. carried out their own repairs, and found that the practice effected a considerable saving of time and money.

AMYTON (Average annual rainfall, 11.82in.).

July 22nd.—Present: eight members and four visitors.

Fallowing.—In a paper on this subject, Mr. H. K. Gum said that the degree of success to be attained in wheatgrowing in their district depended on the quantity and quality of fallow land available for cropping. Fallowing in a year like the present was an entirely different matter from the operation of fallowing in a normal year. After such a prolonged drought the land was naturally much looser and cultivate in the spring to kill the weeds, but in the present season much less cultivation would suffice. The question as to whether the land should be cultivated or ploughed depended, to a great extent, on the nature of the soil. Under average conditions, however, ploughing was to be preferred. Land cultivated only was liable to drift in the hot weather, a contingency which they should endeavor to avoid. The operation of ploughing also assisted considerably in the freshening of the soil. The main object of fallowing was the conservation of moisture in the soil, and with this in view, fallowing operations should be commenced as early as possible. In order to enable this to be done, therefore, late seeding should be avoided if practicable. Mr. W. Gum favored the use of the cultivator, as a greater area could

be worked with this implement. Mr. S. Thomas agreed. Messrs. Ward, Crisp, and O'Donohue favored the use of the plough; their experience was that a 6ft. cultivator required the same number of horses as a five-furrow plough; and the work done by the former was not as good. Mr. G. K. Gum favored fallowing to a depth of 3in.

MORCHARD (Average annual rainfall, 11in. to 12in.).

June 26th.—Present: eight members.

Sheep on the Farm.—In a paper under this heading, Mr. Geo. Gregory said it was to the advantage of every farmer to keep sheep, especially in this district, where wheatgrowing was uncertain, and dairying was unsatisfactory. Lower Northern farmers were turning their attention to hand feeding sheep to tide them over the dry period usually experienced during the autumn; thus there was a lessening of the tendency to glut the market. In his opinion, sheep would be found much more profitable than cattle, and there was less labor involved. There was not only the return from the fats and lambs, but also from the fleece. The writer of the paper then referred to hand feeding tests which had been carried out by the Wool Instructor (Mr. H. Jackson). Mr. Riechstien said that the droppings from the sheep considerably improved the land; and these animals were excellent for cleaning up weeds. Early fodder should be sown to provide feed for them. The Hon. Secretary (Mr. H. G. Kupke) agreed. Two pounds headed straw chaff and 1½bs. cocky chaff, mixed, would keep store sheep in good order. Mr. McCallum had practised hand feeding in late autumn and early winter with satisfactory results.

MOUNT REMARKABLE (Average annual rainfall, 23.04in.). July 5th.—Present: 13 members.

Co-operation.—This subject was introduced and discussed. Mr. N. S. Giles thought that the proposal to co-operate was a good one. Under present circumstances, a good portion of the price paid for an implement represented the cost of agency and commission. The purchase of superphosphate and binder twine could be effected direct from the vendors. The only difficulty would be the extra work which would devolve upon the Secretary. Mr. McIntosh said that under the present system the producers, in their purchases, assisted others, who, in their turn helped them in the marketing of their produce. Mr. Challinger said the present extensive credit system could not be continued under co-operative effort, which would demand cash from everyone. Other views were put forward regarding the necessity for large amount of capital to enable the concern to carry large stocks, and also regarding the management, and distribution of dividends. A motion was carried that steps should be taken to secure the use of an area of land for the purposes of a show and pleasure ground. Mr. T. W. Willington exhibited a quantity of berseem nearly 18in. high, that had been sown towards the end of April. The sample indicated that this fodder could be successfully grown in the northern districts, provided it was sown early.

QUORN (Average annual rainfall, 13.78in.). June 26th.—Present: six members and one visitor.

Conservation of Fodder.—In a paper on this subject, Mr. A. F. Noll referred to the losses of stock which might have been obviated had farmers carried reserves of cocky chaff and straw. He suggested the building of an extra stack of hay, preferably of wild oats, or wheat cut on the green side, during seasons of plenty, It was a good plan to cut with the binder, and stock until after harvest, portion of the crop. This could be put through the header or thresher, the straw being set aside for fodder. Chaff carriers should be fitted to harvesters; and a good stand of straw should be cut with the binder as soon as possible after it had been stripped. Crops likely to yield shrivelled grain would be more profitable if cut for hay. Sorghum and other summer crops often proved a success. Autumn catch crops

were dependent on early rain. The Chairman (Mr. R. Thompson) read extracts from a paper on "Farmers' Lucerne Plots," by the Director of Irrigation (Mr. S. McIntosh). Mr. Cook said that chopped-up lucerne mixed with pollard was an excellent food for fowls. Lucerne plots should be kept clear of weeds, and the plants should be cut off close to the ground.

TARCOWIE (Average annual rainfall, about 15½in.).

LAYING OUT OF A FARM HOMESTEAD.—Mr. H. Edwards read a paper on this subject at the February meeting. He said that one of the most important matters was a good water supply. If water could be secured within 100ft. of the surface he would recommend the sinking of a well, but if not, then he thought it was less expensive to resort to boring operations. The house should be located as nearly as possible to the centre of the holding, and on high ground. It should be built in such a manner that it could be added to at any later time. Stables and outbuildings should, if practicable, be built of stone, and be situated at the back of the house, and not too close to the latter. The stables, the open side of which should face the north, should provide ample protection from cold and rain. He favored a gabled roof of galvanised iron lined with straw. The lining of straw would assist in keeping the stable cool in summer time. The stackyard should be behind the stable, and a 5ft. or 6ft. stone wall around it would afford some protection against fire, and would prevent the entrance of any stock. The chaffhouse and engine room could be built against the back wall of the stables, and if a connecting door were provided, it would facilitate the handling of feed for the horses. He suggested that the barn should be built of stone, and have a galvanized iron roof. implement shed could be erected on either side of the barn, and should be provided with large doors so that it could be closed right up. A separate building should be provided for milking cows, and the poultry yards should be erected at a considerable distance from the other outbuildings, to prevent the fowls causing trouble in the barns and stables. Waste from the haystack and chaffshed should be carted away and fed to the poultry in their yards. The garden could be planted in such a way as to act as a screen between the house and outbuildings, and at the same time provide wind-breaks and shade for the stock.

Co-operation.—At the March meeting Mr. A. Dempster contributed a paper on this subject. He urged co-operation as the means of protecting the producers' interests. The co-operative system should be established on a sound basis, and should receive the unqualified support of all members of the farming community. It was only by this means that they could hope to achieve the success and reap the benefits to which they were entitled. Many co-operative societies existed in England, Wales, and Scotland; in Ireland there were 300 odd co-operative creameries, 150 agricultural societies, and others existed for the fostering of the poultry and other industries. In Australasia progress was being made in this direction. He also suggested local co-operation for the purpose of purchasing veterinary appliances

and drugs for the mutual benefit of farmers in any particular district.

WILLOWIE (Average annual rainfall, 11.90in.). June 22nd.—Present: 10 members and three visitors.

Fallowing, 1915.—Mr. S. G. McCallum read a paper on this topic. The first essential this year, he said, was to provide feed for their horses, and to do that it might be necessary to turn them on to the wheat crops. He would not plough land which promised to provide feed for stock, but all land likely to drift should be ploughed without delay. If this were neglected the drifting would prevent the growth of feed. As there was little growth upon their land, deep cultivation was unnecessary. Owing to the fact that large areas had been sown this season, they would have smaller areas for fallow, and it would therefore be wise to cut a considerable quantity of hay as early as possible, and endeavor to have the ground ploughed up before harvest. Mr. W. P. Foulis also read a paper on the same subject. The following is taken therefrom:—''The problem of how to do our fallowing this season is one that is not easily solved, owing to the scarcity and high price of fodder. There are two very important reasons why we should endeavor to fallow as large an area as possible. The first is that it is our duty to our country to prepare as much land for cropping as it is in our power to do, for

in this great war crisis our country requires every grain of wheat we can produce, and the man who does not put forth every effort to this end should not remain out The second reason is that it is a duty to our neighbors and ourof the firing line. selves to do all that we can to lessen the drift. All will agree that the only means by which this can be done is to fallow or cultivate the large bare areas that are How to economically till our soil at this season is to me an now in our district. unanswerable question, all I can do is to bring before you my ideas as to the most economical means. Our lands are in various conditions, but for all I would advise shallow working, as it will require less strength to cultivate a given area and less working to firm the seed bed. The loose soil can be worked with the spring tooth cultivator, with narrow shares. With four horses this will do from 10 to 12 acres If each horse is given 35lbs. of chaff at £12 per ton, the cost of cultivating will be 1s. 6d. per acre for horse feed. Or, if fed according to the daily ration set forth by Professor Perkins, it could be done for very little over 1s. per acre. If five horses are used a larger area can be gone over, no difference being made in The firmer soil which has not been cultivated during the last the cost per acre. three years but which is not in any way hard can be worked with an ordinary cultivator, skimmer, or ordinary plough. A cultivator worked by seven horses should do from 10 to 12 acres per day at a cost in feed of about 2s. 3d. per acre, if feed on chaff alone; if on a mixed ration, 1s. 11d. A skim plough could be worked for about the same cost per acre. In firmer soils, a three-furrow plough, worked by four horses, should do an acre per horse, at a cost of 3s. to 3s. 9d. per acre, according to the mode of feeding adopted. Thus a five-furrow worked by six horses, would do 6 2-3 acres, a six-furrow by seven horses eight acres, all at a slightly lower Owing to the prevalence of drift, it is advisable to leave an uneven cost per acre. Disc implements should not be used, and I prefer the sulky cultivator to surface. the harrow for the last working before summer. The allowance per horse I have advocated (35lbs. of hay chaff) is the quantity I have been giving mine during seeding, and I am confident that the areas mentioned can be done on this allowance. The rations quoted as recommended by the Director of Agriculture are as follows:-14lbs. of hay chaff, 8lbs. oats and 5lbs. bran; or 7lbs. hay chaff, 10lbs. straw (good cereal), 7lbs. barley and 8lbs. bran. I do not think we can expect any green feed until the spring, unless the horses are put on the wheat. It perhaps would be advisable to do this. My estimated cost per acre is for feed only during actual working time, no allowance is made for loss of time or wages. have tried to procure information as to what the cost would be if done by a traction engine, but have not been able to obtain any reliable data."

CARRIETON, July 22nd.—Deep v. Shallow Cultivation.—Mr. Bock initiated a discussion on this subject. The Chairman (Mr. W. G. Brown) said the practice which should be followed depended entirely on the nature of the soil. Shallow soil with rubbly subsoil should receive shallow cultivation, and deep, hard soil required deep working. The election of officers afterwards took place.

CRADOCK, June 26th.—Co-operation.—This subject was introduced and discussed by members, who supported the proposal for the co-operative purchase of implements and fertilisers.

TARCOWIE, June 23rd.—Annual Meeting.—The annual election of officers took place, and the Hon. Secretary (Mr. J. Burgess) presented the report for the year. After an address by the Chairman, a musical programme was proceeded with, followed by a supper and dance. Members of neighboring Branches were present.

WIRRABARA, June 24th.—Homestead Meeting.—The meeting was held at the homestead of Mr. Josiah Hollitt, and an opportunity was taken of making an inspection of the farm. An instructive time was spent. Some fine fodder crops, grown with the aid of irrigation, were seen. Messrs. H. H. and J. Jericho gave a practical demonstration of the use of explosives for preparing ground for fruit trees.

WIRRABARA, June 26th.—Homestead Meeting —This meeting was held at the homestead of Mr. J. Hollitt. An inspection of the farm was made, and good crops of forage grasses and cereals were seen. Later, an extract from the *Journal* was read by Mr. P. J. Curnow; this was followed by discussion.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).
July 22nd.—Present: six members.

TOMATO CULTURE.—Mr. J. Burton read a paper on this subject. most important matter in the growing of tomatoes was the preparation of a hot bed. This was generally composed of fresh stable manure heaped up several feet high and a few feet wider than the frame which it was intended to use as a shelter for the plants. The manure should be firmly trampled down and damped if necessary. The manure should be covered with a few inches of soil, and the frame should then be placed on the bed. After a few days the seed should be sown in rows about 3in. apart. When the plants appeared, the cover of the frame should be lifted on sunny days. Being strong feeding plants, tomatoes could only be grown to perfection in rich soil, and unless the land was very good, manure should be used freely. The ground should be deeply worked, and well broken up, more especially when dealing with stiff, heavy soils. It was useless to sow or plant in the open ground until all risk from frost had passed. The time for transplanting, of course, varied to some extent according to locality and position. The best way was to plant in rows 4ft. apart, leaving about half that space between the plants in the It was also advisable to support the plants to prevent the branches from lying on the ground. They required a constant supply of moisture in the soil, and suffered severely if the ground became thoroughly dry, therefore water should be used freely in dry, hot weather. Though tomatoes were usually raised from seeds, yet they could be propagated by cuttings, which started freely in sand or light soil if placed in a frame or under glass. Plants raised from cuttings were generally more prolific than seedlings, and came into bearing sooner, but the fruit, as a rule, The ground should be kept free from weeds, and hoed to keep was much smaller. the soil open. It was best to plant early, medium, and late varieties so that the supply of fruit should extend over a long period. Members considered it advisable to manure the ground heavily, and trellis the plants in order to keep the fruit off Some advised using superphosphate and potash with stable manure. the ground. It was advisable to grow tomatoes in fresh land each year.

CANOWIE BELT (Average annual rainfall, 20.04in.). June 23rd.—Present: 13 members and two visitors.

FARM IMPLEMENTS.—In a paper on this subject Mr. G. Kirk emphasized the necessity for keeping all farm implements and machinery in good working order. Worn mouldboards should be attended to before commencing ploughing, and all nuts on the plough should be properly tightened after being used for the first time. In order to have satisfactory work done, the cultivator shares should be in good order. Harrow tines should be renewed when they were worn very short. The drill was a very important implement. Care should be taken that neither seed nor fertiliser became damp, otherwise trouble would be experienced with the driving gear. Attention to the binder would make a great difference to the work which it would perform. Discussion followed. In reply to a question by Mr. Carter, Mr. Kirk said that lucerne seed should be sown with sand in the latter part of August. The soil should be reduced to a fine tilth before the seed was distributed.

GEORGETOWN (Average annual rainfall, 18.32in.).

June 26th.—Present: seven members.

Pasture for Stock During Drought.—Mr. J. Buchan read a paper setting out his experience in finding feed for stock during the recent drought. He said that, with others, he moved his stock to New South Wales, on sandy country east of Cockbura. This country was densely timbered with mulga, and the feed was mainly composed of flowers and creepers. The growth of that feed was very rapid, but after his stock had been on the country for about six weeks he was surprised to find that the feed no longer existed. The stock was then moved to saltbush country, and after a fall of rain of 2in., excellent feed was available. The feed in the saltbush country consisted of spear, wire, blue, and button grasses, and of these the button grass was the most palatable and beneficial to stock. Spear grass also

provided good feed. The death rate amongst stock which was travelled to this country, was very high. The causes of this were—travelling too many cattle in one mob; lack of labor; insufficient knowledge of country travelled; scouring of cattle caused by bad water, and changes of feed; travelling in too long stages; long distances between feed and water, and the fact that many cattle were too weak to travel at the commencement of the journey. His experience had convinced him that the saltbush country was the best to provide feed for stock under such circumstances as existed during the recent drought, and the knowledge acquired might prove of considerable value should similar conditions recur in the

HILLTOWN.

June 18th.—Present: 10 members and one visitor.
Fallowing.—Mr. R. E. Dinham read a paper on this subject. He said that fallowing should be commenced as soon as possible after seeding was completed. The land would then be in a condition to absorb and retain all the winter rains. Land should be ploughed carefully and to an even depth, in order to produce an oven crop. In their district, land should generally be ploughed to a depth of 3in. or 4in., but the lighter soils should not be ploughed quite so deeply. It should be harrowed as soon as possible after ploughing; it would then be in better condition for the conservation of moisture. Subsequent cultivation should In discussing the paper, Mr. C. Kostera said deeper be of a shallow nature. ploughing would be advisable in a wet season. Other members thought the depth recommended was sufficient. Varied opinious were expressed regarding the merits of steel and cast shares for ploughing.

PORT GERMEIN (Average annual rainfall, 12.84in.).

July 10th.—Present 12 members.

The Hydatid.—The Hon. Secretary (Mr. Jas Stewart), by means of diagrams, explained the life history of the hydatid, and read the following paper on the subject:-- "Every member of the animal kingdom, from man down to the simplest living creature, is liable to be infested by parasites. They may live on the surface of the body, as, for example, the tick on the fowl or the flea on the dog; They may live on the or the parasite may live as a worm in the internal organs of the larger animal. The larger is called the host, because it entertains, however unwillingy, its tiny guests. Of internal parasites, there is a large class known as tapeworms. They are of great interest to us, because, unfortunately, the tapeworm sometimes makes man its unwilling host. Further, they are of interest because they have the peculiarity of passing part of their life in one animal and part in another. The parasite known as the hydatid passes the tapeworm period in the body of a dog or dingo, the bladder or globe period is lived in the body of a man, or monkey, sheep, kangaroo, and other animals. It even passes this globe period in the peacock and some other birds. The length of the tapeworm is remarkable; up to 40ft. is sometimes recorded. This is made up of numbers of parts or segments, united by joints. But the hydatid tapeworm is only 1-5th of an inch in length, and is made up of four parts, a head and three segments. The hydatid is found in several parts of the world, but is most abundant in Southern Australia and Iceland, both alike in having many sheep and dogs. Many of the dogs in South Australia are infested with three kinds of tapeworms, of which the hydatid tapeworm is by far the smallest. It lives in the upper portion of the dog's intestine, a little below the stomach. The head of the tapeworm is provided with 30 or 40 hooks, arranged in two rows. Below these are four suckers. Joined end to end and connected to the head are two small segments, and then comes a longer and broader segment, which is filled with hundreds of tiny eggs. When the eggs are ripe, the last segment is broken off and passes out of the dog, another segment growing in its place, reproducing eggs; so the tapeworm goes on living and casting off bags of eggs. These eggs are not easily deprived of life, and as the dog moves over a wide area of country, they are widely scattered. They can easily get into the food, and especially the water, consumed by man and animals. For instance, the eggs can get into a dam, and so infect a whole flock of sheep. In the South-East,

where hydatids are very common, the tapeworm eggs find their way into many swamps, and so gain hosts in the numerous sheep that drink from the swamps. When the eggs of the tapeworm enter the sheep's or even man's body, the covering or shell is soon digested and sets free a tiny, lively, round creature with six hooks on it. By means of these hooks the little creature can burrow It soon gets through them, and very rapidly into the walls of the stomach. enters an artery or some other blood-vessel, moving along until the walls of the pipe narrow so much that it cannot get any farther. It has now reached one of the organs of the body, such as the liver, or the lungs or heart; any part of the body will do for its home. It now settles down for its life's work. First it drops its six hooks, as they are of no further use; then inside of it a hollow forms, and gradually fills with a watery fluid, so that it becomes like a tiny bladder filled with water. This grows to the size of a grape, then it may increase to the size of an orange or even a football. It pushes aside the living tissue of the body to make room for its increased size. While the ball is thus growing many changes are taking place in it. Buds form on its inner surface, they become hollow and filled with fluid; then they break off from the side to which they are attached and float about in the fluid of the big ball. So the growth goes on, globes forming within globes. But there are other changes which we must carefully consider. The heads of the tapeworms are being formed in thousands. When ready they drop off and float about in the fluid. If you hold up a globe which you might find in the liver of a sheep you will see in it little specks like grains of sand. These move as you turn the globe. They are the heads of the future tapeworms. As long as the sheep are alive They are the heads of the future tapeworms. As long as the sheep are alive these heads are prisoners, but as soon as the animal is killed they are liberated. A dog eats the liver, and they fix themselves in hundreds to the dog's intestines, Thus we have traced the life history of and in 30 or 40 days are tapeworms. the parasite. Now, what can we do to prevent the ravages of hydatids among human beings or animals? 1. Never drink water from holes or dams frequented by dogs unless the water is boiled. 2. It is safer also to boil water from underground tanks. 3. All vegetables which are eaten raw should be thoroughly cleaned with water which has been boiled. 4. Watercress is 5. Dogs should not be especially dangerous unless such precautions are taken. allowed to lick children. There is no doubt that hydatid disease has become less common in our North since the large reservoirs were formed to supply pure water to both people and stock, but there are still too many cases, particularly in the South-East. The host may eventually die from the hydatid globes pressing upon and so injuring some vital organ of the body, or by the globes bursting and pouring their contents into vital channels of the body. Sometimes, however, the hydatid globe dies, and then shrinks and becomes calcified, that is, changed into a stony condition in the shape of lime; so that many people have had hydatids without being much the worse or being the wiser for their experience."

PORT PIRIE (Average annual rainfall, 13.21in.).
June 26th.—Present: 10 members.

CO-OPERATION.—After reading the annual report the Hon. Secretary (Mr. A. M. Lawrie), introduced this subject for discussion. Mr. J. Greig said, although he was a firm supporter of co-operation, he did not think the scheme outlined by the Clare Branch would be a workable one. Bureau members would not be willing to sign guarantees as suggested. Messrs. McEwin, Kirchner, Eagle, Martin, Welch, Lines, and Johns also spoke, and a resolution was passed, that the Branch disapproved of the inauguration of a co-operative system in connection with the Bureau.

FORT PIRIE (Average annual rainfall, 13.21in.). July 24th.—Present: 11 members and one visitor.

SIDELINES FOR THE FARMER.—In a paper on this subject, the Hon. Secretary (Mr. A. M. Lawrie) said farmers should give attention to everything that the soil was capable of producing. Whilst the production of eggs, butter, grapes, and feeding of pigs, &c., involved constant labor, these could be made to double the income that would be secured from wheatgrowing only. Vines would be found to yield a splendid return in suitable localities, and they required most

attention when the labor was needed in connection with other activities. Sheep should be kept, if only to provide rations and keep down the weeds on the fallow. Even if it were necessary to resort to handfeeding at times, this class of stock should prove profitable. If in good seasons threshed straw and cavings were carefully conserved, these could be profitably fed to the sheep. If irrigation were practised in this district, green feed could be produced all through the year. One or more of the lines mentioned could be profitably adopted on most farms. Mr. A. L. McEwin had found it profitable to kill his own mutton; cows, pigs, and poultry were also profitable for the farmer. Mr. W. Martin agreed, and urged the necessity for careful attention to any side lines. Messrs. J. Greig and Welch also supported this opinion. Mr. F. Jose thought it more profitable to kill calves and feed the milk from the cows to pigs; but other members advised the rearing of all calves, on account of the high prices ruling for stock. Mr. Munday had had good returns from poultry before the advent of the fox pest. Sheep should be always kept on the farm.

SPALDING (Average annual rainfall, 20.25in.).

June 26th.—Present: eight members.

SHEEP ON THE FARM.—Mr. D. A. Campbell read a paper on this subject. said that with the promise of good seasons ahead it was the duty of every farmer to do his utmost by breeding to replace the enormous loss of stock caused by the drought. Horses, cattle, and sheep had died in such numbers that it would take years to replace them. Flocks especially had suffered, more particularly as a result of the three successive unfavorable lambing seasons. The most profitable sheep to breed in their district was the Merino, on account of its ability to withstand severe weather conditions. The English breeds were more adapted to the southern and moister districts. To a farmer commencing to breed a flock he recommended the purchase of some well-known flock ewes, aged for preference, a number of which came into the market off shears in ordinary seasons. If these ewes had passed the classers for several seasons, then they would prove a good foundation for a beginner to start with. On no account should two-tooth ewes be purchased, unless they had been inspected in the wool. A good ram should be secured, preferably from the same flockmaster. Many reliable breeders also allowed rams out on hire each season. The best time for mating was about the middle of November, allowing the ram two months. This would secure an April-May lambing. From 50 to 70 ewes could be allowed for each ram. The rams and ewes should not be too fat, and it was advisable to yard them every night for a week or more. Ewes might be mated when one and a half years old, but a ram should not be used until it reached the age of two and a half years. All ewes with blind teats should be set aside for killing. Plenty of good water should be provided for sheep during the summer. May and June were critical months with breeding ewes, even in normal seasons. This was the period when handfeeding would be profit-Lambs should be marked when from six weeks to two months old. operation was more painful than if done when younger, but the wether lambs afterwards had a better appearance, with decided horns. Sufficient tail to cover the unwoolled portions of both sexes should be left. He favored the searing iron for A shield should be used to protect the delicate parts of the body from the heat of the iron. With this method there was no loss of blood. If a knife was used it should be disinfected with a strong solution of permanganate of potassium immediately before using; on no account should lambs be marked in a horse yard or where there was any manure lying about. Ewes and all grown sheep should be carefully cleaned from the effects of scour as soon as noticed to avoid loss of condition. A change of paddocks was essential to the improvement of a flock, removal from a good paddock to an inferior one was an improvement; failing this the sheep could be run on the roads a few times, and the paddocks would gain feed and sweeten while the sheep were out. Before shearing the least profitable sheep should be rejected; the back was the most important portion of the fleece, and sheep showing a weakness there should be culled. A dry, harsh-woolled sheep was not suitable, nor, on the other hand, was an animal carrying a fleece containing too greasy wool. When selling part of a lamb flock all the robust animals should be retained. In this way the standard of breeding could be maintained.

YONGALA VALE (Average annual rainfall, 13in. to 14in.).

June 26th.—Present: nine members.

CULTIVATION.—Mr. C. Davies read a paper on this subject. He said that cell-siderable trouble was experienced in the cultivation of land with the V-type cuttivators, as they caused ridges in the soil. If it could not be cross-cultivated, the ridges made drilling operations difficult and unsatisfactory. Other types of cultivators also left a great deal to be desired; they left the ground in such a centition that the drills very often did not cause the seed to be covered. He recommended sowing the wheat to a depth of $2\frac{1}{2}$ in. to 3in. Disc cultivators were the most satisfactory; they left the ground in good condition, and did not require so many replacements. Messrs, Battersby and Lloyde did not favor sowing wheat so deep as 3in. Mr. Jamieson considered the disc cultivator successful only under dry conditions.

BEAUFORT, June 24th.—On the occasion of Arbor Day, the afternoon was devoted to tree-planting. In the evening a lecture on afforestation, illustrated with lantern slides, was delivered by Mr. H. H. Corbin, B.Sc. (Instructor in Forestry).

BEETALOO VALLEY, June 21st.—Annual Meeting.—The Hon. Secretary (Mr. P. Curtin) read the annual report, which showed that six meetings had been held during the preceding 12 months, and the average attendance of members had been six. It was hoped that with the promise of a good season, a revival of interest in Bureau work would take place.

LAURA, June 24th.—Annual Meeting.—The Hon. Secretary (Mr. R. J. Rose) read the annual report for the first year's working of the Branch, which showed that regular and instructive meetings had been held. The election of officers for the forthcoming year then took place. Messrs. H. J. Finnis (Assistant Secretary to the Advisory Board of Agriculture), and P. H. Suter (Government Dairy Expert), afterwards addressed the meeting, the former on Bureau work, and the latter on the dairying industry.

NARRIDY, June 26th.—Co-operation.—A discussion on this subject was initiated. It was said that the Branch had already resorted to the co-operative purchase of certain farm requirements, such as potatoes, sugar, &c. Members thought, however, that existing institutions, with modifications if necessary, would meet the requirements of producers.

PORT GERMEIN, June 12th.—Annual Meeting.—The annual election of officers took place. Mr. A. Carmichael exhibited three samples of growing wheat, Gluyas variety, sown before the first rains with 50lbs. super, 36lbs. super per acre, and without super respectively. The first sample was by far the best of the three. Mr. Stone read an extract on "The value of the drought."

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

BUTE (Average annual rainfall, 15.42in.).

June 23rd.—Present: 15 members and two visitors.

Sand-drift.—Mr. W. J. Hall read an extract from a publication on this subject, which recommended the planting of blue lupine for preventing sandy soil drifting. Messrs. A. Schroeter, Buchanan, Paterson, Davies, and McCormack took part in the lengthy discussion which followed the reading of the paper. Mr. Hall said that the timber in the district should not be destroyed, as not only did it improve the aspect of the country, but it also bound the soil. It was resolved to suggest to the local district council that trees growing on the roads should not be destroyed.

CLARE (Average annual rainfall, 21.30in.).

June 25th.—Present: nine members.

Breeding and Feeding of Pigs.—A paper on this subject was read by Mr. F. J. He favored the pure Berkshire pig, or the Berkshire boar crossed with the Middle Yorkshire sow. Animals of this cross did well confined in pens, and were the easiest to keep fat. For breeding purposes the long-bodied sow, broad across the loins, should be selected, and it should come from a mother that produced large litters, but not from an old sow, especially if she had been served by the same boar too frequently. Each sow should produce two litters a yeareight pigs each time. At an average price of 12s. 6d. a head when seven weeks old, these would bring in £10 per sow. If fattened, they should be ready for market at six months old, and weigh from 150lbs. to 160lbs. They should then A sow which did not average eight pigs per litter should be ld. Pigs in the process of fattening should not be allowed too The sties should be kept clean, and the pigs should not have too bring £3 a head. fattened and sold. much exercise. much feed at any one time; it was better to feed them three or four times a day. Peas and Cape barley were very fattening. All grain should be crushed and soaked. Breeding sows should have plenty of exercise; Milk had great fattening qualities. a small paddock should be provided for them. They should not be too fat, because when they farrowed they were very clumsy, and were apt to lie on the young Sows, after farrowing, should not have long straw for bedding, as the little pigs became tangled in it; short straw or oaten husks should be provided. sties should not be allowed to become damp. When the little pigs were three weeks old they would be able to eat, and could have a small pen with a trough in it, and connected by a small hole with the parents' sty; a little crushed grain and milk could be fed to them. The sow would also benefit if the young ones were fed separately, and would not lose her condition. She might have her first litter when 10 months old, but she should be fed well, or the pigs would be stunted. Breeding sows running outside the sties could be fed on whole grain strewn about the yard. Whole grain should not be fed in a trough unless it had been soaked fully three Fruit, when fed to pigs, produced flesh quite equal to that produced by grain, and the bacon produced was very sweet. Discussion followed.

JULIA (Average annual rainfall, 18in. to 19in.). July 26th.—Present: eight members and two visitors.

INCREASING THE PRODUCTION OF THE LAND .- A paper, from which the following is taken, was read by Mr. J. Dunstan:--"Is our land producing as much as it should when we consider how land values have risen during the last few years, is a question a good many of our men on the land have been asking themselves. answer this question in some way is the object of this paper. Land that is now bringing £10 and over per acre, a few years ago was valued at £5 and under per acre, but it does not produce any more wheat now than when it was cheaper, really not as much; but more weeds and rubbish. It seems that the more continuously one crops land, especially with wheat, the worse the weeds become. that land is worth the figure to which it has risen lately, to grow wheat alone on the fallow system. One crop in two years is not sufficient return for the expenditure. The most promising method of meeting the case seems to me to be rotation of crops, i.e., instead of wheat following wheat, sow the stubble with barley or oats. Experiments have been conducted at Roseworthy College in sowing wheat stubble lands with barley and oats and some very good returns have been harvested. One of the worst drawbacks in this State to this practice is the market for barley and oats, which is very unsatisfactory from the growers' point of view. It will pay the farmers to store these grains and feed to stock, poultry, and pigs, rather than to sacrifice them in the local markets when a glut is on. They provide a splendid stand-by in time of drought. Lucerne-growing seems to be the very backbone of dairying. We should feed lucerne in the summer, and save the dry feed such as cocky chaff and straw chaff mixed with some crushed barley or oats (instead of selling it at 1s. 6d. per bushel, as we have done in the past) in the winter. Lucerne will grow on the flats by the creeks in this district, but if one has a good well or spring a patch of lucerne could be irrigated, and this should ensure a sufficiency of butter. An acre or two of orchard should be on every farm. Wind-falls and waste fruits can be fed to pigs along with the skim milk from the dairy. I do not think sheep can be kept on the smaller farms, except for meat. The small farms always seem to have far too much stock on them without introducing sheep."

MALLALA (Average annual rainfall, 16.88in.). July 5th.—Present: 16 members and one visitor.

Annual Meeting.—The Hon. Secretary (Mr. A. E. Temby) read the annual report for the preceding 12 months. Nine meetings had been held during that period, and instructive papers were contributed at each. The average attendance of maphers and visitors per meeting was 20.

of members and visitors per meeting was 20.

CO-OPERATION.—Mr. A. V. Nairn addressed the meeting on the question of co-operation applied to the insurance of stock, produce, &c. He thought insurance companies were paid far too much for the risks they covered, and thought that a local co-operation could be formed with advantage. Members unanimously supported the proposal, and it was decided to further discuss the matter at a later date.

RIVERTON (Average annual rainfall, 20.48in.). April 14th.—Present: 15 members and one visitor.

AGRICULTURE, ANCIENT AND MODERN .- In a paper under this heading Mr. J. McInerney, J.P., traced historically the development of agricultural practice. The importance of the improvement of machinery on agricultural methods was mentioned, and the system of cultivation at present adopted, was referred to as follows:—''On many farms the triennial principle is adopted; that is to say, onethird of the cultivable area of the farm is fallowed; one-third placed under crop; and a like proportion rested or grazed. Under this system the same land is cropped but once in three years. In other, and probably the majority of cases, the biennial system is in vogue, under which one-half of the land is cropped, and the remainder fallowed. The former system has advantages which are lacking in the latter; chief amongst them being the fact that there is less soil exhaustion—it retains its fertility in a larger measure, and consequently responds more readily to the use of fer-Another feature of this principle is that a greater number of live stock, especially sheep, may be kept on the farm throughout the year, thus adding to the farmer's income; probably, at least to the same extent as would be the case were half the land cropped, and fewer sheep held. Another consideration is that the land is kept more free of weeds where sheep are depastured; and their action in treading over the soil gives to it a compactness which is beneficial. With this brief allusion to rotation, the method of tillage may be referred to. It is when fallowing begins that the first step is taken to prepare for the next season's whoat crop. Fallowing is sometimes done in the autumn, but more frequently during the winter months, which is, perhaps, the ideal season for this all-important work-commencing immediately after seeding operations are finished, and continuing until not later than the middle of August, when, under ordinary conditions, fallowing should During the spring months is the time that the real business of givbe completed. ing to the fallow that desirable tilth which is such an important factor, and upon which so much depends, is done. The judicious and liberal use of the harrow and cultivator, subject to weather conditions, gives to the soil that mellow state which is an essential element to success. It may happen that stray weeds have survived, or fresh ones appeared; these can be checked by turning in the sheep at intervals. autumn rains will bring up a fresh crop of weeds, and if the time for seeding is not quite at hand, the heavy harrows, or even the cultivator, should be used for the double purpose of destroying the young growth, and tending to make the stiffer soil open and porous. Where time does not allow the whole of the fallow being attended to in this way, at least that portion of it which is to be sown last should be worked, and seeding operations started as soon as may be, where the weeds are still untouched. Various methods of pickling the seed, as a preventive of smut or bunt, are in vogue, but that most commonly practised is by immersing the bags in a solution of bluestone and water contained in casks sufficiently large for the purpose. Pickling.—Much diversity of opinion exists amongst farmers as to the proportion of bluestone to be used. Authorities on the subject recommend from one to one and a half pounds of bluestone to 10 galls. of water. The English system of half a century ago was to dissolve sulphate of copper in water at the rate of 20zs. to a pint for each bushel of wheat. The grain was emptied on the floor, and turned repeatedly, while the solution was being sprinkled over it. A return to this method is coming about largely as a result of tests made by practical farmers who claim that under this system a more even distribution of the liquid is given to the seed. It may be permissible to give an example on this important point. For every three bags of wheat (9bush.) dissolve 1lb. of bluestone in 3 galls, of water. The grain is emptied on the floor and turned whilst the solution is being sprinkled on it; then re-turned and shovelled into butts. If there are two men with shovels, while another does the sprinkling, the work can be done quickly. Care should be taken to sweep in the scattered grain around the heap after each turning. Seeding .--Generally speaking, the season for this work extends from April to June in the central and southern districts, though oftentimes the date of starting is governed by the nature of the season. The most desirable conditions are those under which the soil is moist enough to cause a regular germination of the grain. When those conditions are present the young plants will appear in about seven or eight days. Pains should be taken to see that all weeds are destroyed and a good seed bed This is best accomplished by means of the cultivator working at a fair depth. If unsettled weather conditions prevail, it is not wise to have too much cultivating done ahead of the seed and fertiliser drill, especially if the land is of a clayey nature; for, should it become wet the subsequent work of drilling is not so satisfactory owing to its liability to consolidate. It is well, therefore, that the drilling and harrowing should follow closely upon the cultivator, and thus remove the risk of having a portion of the work, however small, spoilt by wet weather. It is not intended to notice here the many different varieties of seed in use, further than to remark that where early and late sorts are used, as is invariably the practice on most farms, it is considered advisable to sow the later, or slow growing wheats Some difference first, in order to lengthen the season or period of development. of opinion exists concerning the quantity of seed to be sown. There are advocates of a 2-bush. per acre seeding, whilst others claim that 50lbs. or 60lbs. per acre is ample. Tests made at the Agricultural College go to prove that about 90lbs. of seed per acre gave the better results. The condition and quality of the soil may be a determining factor in this connection, but for general purposes a seeding of $2\frac{1}{2}$ acres with each bag of graded or screened seed is favored." Reference was also made to the use of artificial fertilisers.

RIVERTON (Average annual rainfall, 20.48in.).

May 31st.—Present: 15 members.

POULTRY RAISING.—In a paper on this subject, Mr. A. Hannaford said that Selection and breeding farmers did not pay sufficient attention to this industry. during the last century had effected a wonderful improvement in the productivity of poultry, and the fact that poultry did not prove to be profitable on some farms was due to neglect or lack of knowledge on the part of the farmers. The farmer should select one breed, and keep birds of that kind only. White Leghorns were excellent fowls for egg production. In starting poultry keeping, it was best to secure a few pure-bred birds from a reliable breeder, and breed the required numbr from them. The male bird should be changed occasionally, and stock should be bred from the best only. The birds should be mated in early winter, and chicks should be hatched not later than September. All breeding stock should be more than 12 months old to obtain the best results. Dust baths should be provided for the fowls, so that they could free themselves of insect pests, and scratching material, such as cocky chaff, should also be placed in the yards. The feeding should consist of bran and pollard mash (hot in winter and cold in summer) in the morning, lucerne at noon, and hard grain towards evening; the latter should be thrown er in the yard. Hatching was best carried out with the aid of the The chicks were less likely to be troubled with vermin, and better atinto the litter in the yard. incubator. tention could be given them. When chickens were two months old the cockerels should be separated from the pullets. He was of opinion that flock birds thrived better, and required less attention, if they were allowed plenty of freedom. It was most important that fowlhouses should be kept thoroughly clean and free from Fresh water should be frequently provided in clean vessels. and shell grit should be always available, and during the moulting season some form of meat should be fed to the birds.

WATERVALE (Average annual rainfall, 27.17in.).

June 21st.—Present: 12 members.

CEREALS FOR GREEN FEED .- Discussion took place regarding the feeding values of rye, wheat, and barley. Mr. Parker was of opinion that rye was superior to wheat or barley when young, but when in ear was not so valuable. Mr. Baker

recommended King's Early wheat for green feed.

PRUNING.—In reply to a question, Mr. Hunter said he was pruning back all fruit spurs on his apple trees. Mr. A. Burgess thought it necessary that fruit spurs should be regulated. Mr. F. L. Burgess said that if fruit spurs were pruned to too great an extent, there would be a tendency for the trees to produce too much wood. Mr. J. Scovell thought that heavy pruning of apple trees made them more liable to bitter pit. In reply to a question from Mr. F. L. Burgess, in regard to pruning a two-year-old apricot tree with 8ft. or 9ft. of growth, members recommended cutting shoots back to 7in. or 8in. Mr. Parker, who had last year heavily pruned some old apricot trees, which had since made rapid growth, was advised to prune back to Sin. or 1ft.

LYNDOCH, May 27th.—ORCHARD INSPECTION.—Mr. J. Mitchell read a paper, in which he criticised the system of inspection in connection with the eradication of codlin moth, and suggested as a means of checking the pest the prohibition of the sale of infested fruit.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA (Average annual rainfall, 15.22in.).

June 26th.—Present: 12 members.

FODDER CONSERVATION.-Mr. A. B. Fergusson read a paper, in which he dealt with the question of conserving fodder for use during times of drought. most suitable means of meeting the difficulty, he said, was to set aside a good stack of hay. The farmer, in a good season, should sow 100 acres of stubble to oats; this would provide an excellent reserve, without interfering with the ordinary income. Also, it might be wise to cut 25 or 30 acres of the best of the wheat crop. scribed the method he adopted in stackbuilding, and recommended as the next best means to hay of providing a stand-by, cocky chaff. The difficulty with this was that after it was 12 months or so old, it developed a musty smell, and stock did not care for it; therefore fresh heaps should be put up each year. These should be A straw stack was always of value in the paddocks, and he covered with straw. was always of value in the pattocks, and he made a practice of fencing these in until the first rains of the season fell, after which stock were allowed access to them. However, straw was not a suitable feed for working horses. The addition of salt to the straw when stacking made it more palatable, and more easily digested. Mr. J. Atkinson said hay, if properly stacked, would keep for at least 10 years. Wr. W. J. Brinkworth had kept cocky chaff for a number of years, but it needed to be well protected from the weather; preferably by a shed. Mr. W. B. Stacey recommended erecting the straw stacks around posts or old trees; they would not then collapse when stock were eating them. Mr. A. B. Fergusson mentioned that mice would not damage a stack that was well weighted and compressed.

YORKETOWN (Average annual rainfall, 17.47in.).

June 19th.—Present: 10 members.

WEATHER NOTES. Mr. Correll read a paper with this title. He compared observations he had made in various years, regarding directions of winds, and electrical disturbances. He also emphasized the necessity for storing up reserves of fodder to tide over lean years.

Show Judging.—Members discussed this matter, and agreed that the proposal to award prizes on a basis of points would be a good one, but did not think it would be practicable in every case, and that each society should be allowed to settle the matter for itself. In reply to a question, members recommended the following fodders for growing on bare patches:—Rhodes grass, kale, saltbush, Blitum capitatum.

KADINA, July 16th.—Co-operation.—Mr. Pedler read a paper from the *Journal* on this subject, and discussion followed. Members unanimously expressed their approval of the principle.

MAITLAND, July 3rd.—Annual Meeting.—The Hon. Secretary (Mr. C. Pitcher) presented the annual report of the Branch for the year, which showed that 10 meetings had been held, at which the average attendance of members was nine.

APPLICATION OF STABLE MANURE.—In reply to a question, Mr. J. Hill recommended the prompt application and ploughing in of stable manure. Where this was not practicable, the manure should be placed in a heap and covered with earth. It could then be applied to land later as a top dressing. Members favored immediate application of farmyard manure in preference to allowing it to rot before applying.

MINLATON, June 24th.—Judging at Shows.—This subject was discussed, and a resolution was passed supporting the proposal to institute the award of prizes on a system of points. Mr. Davies read a paper describing experiences in the early pioneering days.

WESTERN DISTRICT.

BUTLER (Average annual rainfall, 16.61in.).

May 11th,—Present: nine members.

FEEDING AND CARE OF FARM HORSES .- Mr. C. F. Jericho contributed a paper on Generally, horses should receive better attention than was meted out to them, he said, more especially was this so in the newly-settled districts. not reasonable to expect a horse to work after having been subject to wet and cold wind during the night. A good shelter could be made from bushes or mallee roots packed to a height of 7ft. In warm weather the working horse should be watered at least three times a day, and it required not less than from 481bs. to 56lbs. of good chaff per diem. If cut straw or cocky chaff were used, corn, sucn as crushed oats, or bran and pollard should be added. A pint of molasses and alb. copra cake added occasionally to the ration would have a beneficial effect on the health. Rock salt should always be available. Each animal should be provided with a separate manger, and be either tied up or separately stabled. Oaten hay, cut at the right stage, constituted the best feed; cut on the green side, it was not so palatable, but with the addition of a small quantity of molasses and bran, it made excellent feed. Overdriving would reduce the condition of the animals very quickly. Members generally agreed with the views of the writer of the paper. Mr. P. G. Phillis would cut oats to be fed long on the green side.

BUTLER (Average annual rainfall, 16.61in.). July 19th.—Present: five members.

Fallowing.—The following paper on this subject was read by Mr. S. M. Bawden:—''Fallowing should be commenced as soon after seeding as possible, and be finished by the end of August. I consider 3in, to 4in, deep enough to plough in our district. The main point is to see that all the ground is cut and turned over. Ploughs should be made to cut a width of not more than 7in, to 8in.; after they have been worked for a season or two they spread. It is advisable to use as much draft as possible in order to get rid of the stumps and bushes. The spring draught implement is the best with which to fallow; it will pull up more stumps and kill more

bushes than the bridle plough. We cannot get the best results from our land until the stumps are killed. After every rain the ground should be gone over with a heavy set of harrows. This will prevent the ground setting hard, and at the same time assist in the conservation of moisture. It is more profitable to have a small area of well-worked fallow than a larger area of dirty and badly-worked ground. All fallow should be cultivated at least once before harvest, and harrowed down again soon after rain. Before seeding all bushes should be cut, raked and burnt; one cannot profitably grow wheat and bushes together. I find it a good plan to cultivate my fallow with a tine cultivator before drilling; also to harrow it before the drill. This makes an even seed bed."

CARROW.

July 22nd.—Present: 16 members and three visitors.

Co-cpl.ation.—This subject was dealt with in a lengthy paper by Mr. F. J. Anear. Whilst the ruling idea that if goods were purchased in large quantities, a large discount in price could be secured was generally true, he said, the fact that a responsible body would have to guarantee the account should not be lost sight of. In the matter of bulk purchase of superphosphate, it was pointed out that whilst discounts could be secured on some brands, this was not the case with others. The most the farmer could expect to secure in this way was a reduction of 5s. per ton, in return for which he would have to tie himself down to purchase from certain firms. Of this 3s. represented the usual commission paid to local agents. The idea of co-operation was to secure goods direct from the manufacturer, but this, it was pointed out, was not always practicable, especially in the case of imported lines. If each farmer could pay cash for his requirements, and goods were ordered in large quantities, he could generally command a rebate; but this was not always the case. The writer of the paper then referred at length to existing co-operative organisations. A lengthy discussion followed, in which Messrs. T. Beare, Umlauf, Matthews, and Barranger took part.

COORABIE (Average annual rainfall, 11in. to 12in.).

July 3rd.—Present: 15 members and four visitors.

CO-OPERATION.—Mr. Stretton initiated a discussion on this subject. Mr. Murray said that one great difficulty was the difference of opinion held by farmers in regard to the most suitable makes of implements, super., &c. Mr. Riddle thought Branch members could at least co-operate in the purchase of cornsacks. The discussion was adjourned until after Congress.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

June 22nd.—Present: 17 members.

POULTRY KEEPING ON THE FARM.—Mr. A. O. Dawkins read a paper with this title. From the farmer's standpoint, he said, the main consideration in poultry keeping was egg production, and the White Leghorn breed had proved to be the hest for this purpose. This breed, however, was of little value for the table, and for this he recommended Black Orpingtons. The treatment of fowls had an important bearing on the returns received from them. They should be housed pro-Perly; the houses being warm, free from draughts, and so constructed as not to harbor tick or other vermin. It was unwise to allow the fowls too much freedom. It would be found profitable to erect suitable yards; the fowls could then be fed systematically and regularly, and sick fowls could be given proper attention. method of feeding also was most important. A bran and pollard mash mixed with hay chaff and water sufficient to produce a crumbly mass should be fed in the This should be placed in receptacles in the yard. morning. A minced up liver should be mixed with the mash occasionally. At midday green feed should be supplied. In the evening whole corn should be thrown into a bed of cocky chaff. This would cause the birds to scratch for the corn, and thus give them exercise. The

best layers would in nearly every case prove to be the most vigorous scratchers. Chickens should be bred only from the best fowls, so that a good standard was main-Where White Leghorns only were kept it would be necessary to adopt artificial means of incubation. With care and experience, good results could be ob-The price of eggs was usually highest from tained with the modern incubator. March to August, so chickens should be hatched to commence laying some time in Incubation, therefore, should be commenced in August, and continued during September. Clean eggs only should be used. Regular trimming of the incubator lamps was very important. For raising the chicks he preferred a flannel-lined box to a heated brooder. The marketing of cockerels and the culling of the less productive hens should also receive close attention. In reply to questions Mr. Dawkins said that fowls should not be fed on wheat alone, but should receive a variety of foods, including meat and greenfeed; supplies of charcoal and shellgrit should also be available. Copra cake was too fattening for laying hens. In handling eggs, care should be taken that grease did not come into contact with them, and they should not be kept on hand for more than a week.

GOODE (Average annual rainfall, 12in. to 13in.).

June 23rd.—Present: 16 members.

SEEDING ON SCRUB LAND.—The Hon. Secretary (Mr. W. Folland) read a paper on this subject. He said that bush land, in the first year, should be ploughed 3in. to 3½in. deep, and harrowed down to a fine seed bed. It was also an advantage to go over the ground with a horserake to gather up roots lying on the surface. Wheat should not be sown too deeply. Thorough cultivation and fallowing would produce the best results. Mr. H. Packer also read a paper on this subject. The majority of the scrub in their district, he said, would have to be cut down, as it was too heavy to roll. February was the best time to burn. As soon as possible after burning, the land should be share-ploughed to a depth of not more than 3in. Early wheats would be found most suitable in their district. He favored a light seeding of about 351bs. per acre, but the amount of super. to be applied should be settled by each farmer, according to his circumstances. Mr. C. Will thought either disc or share ploughs suitable for breaking up new ground. Mr. V. J. Tonkin favored the share plough as more suitable for the destruction of roots. Mr. W. Burner advised sowing scrub land before bush land. Mr. P. Morcombe considered that fallowed land should be sown after rain, as a better germination would then result. Mr. W. Morcombe explained the process of capillary attraction and the action of continuous cultivation in checking loss of moisture from fallow.

KOPPIO (Average annual rainfall, 22.40in.). June 24th.—Present: eight members and one visitor.

DESTRUCTION OF RABBITS.—Mr. T. R. Gardner read a paper on this subject. He said that the first essential to forward the eradication of rabbits was good, sound Wire netting 3ft. 6in. in width should be used on all fences intended to be rabbit-proof. This should be put in the ground to a reasonable depth to ensure that the rabbits could not burrow under. Care should be taken to see that all gates and panels were rabbit proof. If allowed to establish themselves in a crop, the rabbits would do a considerable amount of damage before they were dis-Where rabbits were numerous, the poison cart would be found very covered. effective. If possible it should be employed after a fall of rain, as the rabbits would then take the baits more readily. If neighbors would lay poison on their respective boundaries at the same time, much better results would follow than if the work were done at different times. After the use of the poison cart, all burrows should be dug in, and any remaining rabbits destroyed with the aid of dogs. Where large warrens existed, ploughing could be resorted to to save labor. burrows in clay soil, which could not be successfully dug or ploughed in, should be treated with poisonous gas. It was necessary to pay continual attention to the eradication of this pest, otherwise the profits from the farm would be considerably curtailed. Mr. W. R. Richardson said a good method of effectively closing burrows was to fill them in and cover the entrances with netting. Mr. G. B. Gardner emphasized the importance of simultaneous action by land holders in the same district.

MILTALIE (Average annual rainfall, 14.55in.).

June 25th.—Present: nine members.

Sheep on the Farm.—In a paper on this topic, Mr. Busch said that owing to the scarcity of stock in their district, they should give consideration to the rearing of sheep; they should only have a small flock of 50 to 100 full-mouthed ewes, which should be mated with a Merino ram. If breeding with the idea of producing mutton, he would recommend the mating of Shropshire ewes with a Merino ram. Steps should be taken to protect the sheep against tick and maggot fly, and if the sheep were kept in good condition it would be found that they will not suffer so severely from these pests. A good supply of water was an essential. These animals would greatly assist in the destruction of weeds on fallow, and would also improve the land. The paper was discussed by members, who agreed that the Merino sheep was the best for their district.

MITCHELL.

June 26th.—Present: 10 members and four visitors.

ANNUAL MEETING.—The Hon. Secretary (Mr. A. Ashman) read the annual report, which showed that the average attendance of members per meeting for the past 12 months had been 13.

Well-sinking.—Mr. H. Voumard read a paper on this subject. He said that, if possible, the site of the proposed well should be on firm ground. A properly constructed windlass should be placed over the well for use when a depth of 6ft. or 7ft. was reached. Where explosives were necessary, only light charges should be used in earth of a loose nature, and they should be made as far away from the sides of the well as possible. When blasting solid rock, the drills should be made near the sides and corners, and the results would be better if they were deflected from the vertical. If brackish water was struck, holes should be made around the sides of the well a couple of feet from the bottom. It might then be found that while brackish water was coming from one direction good water flowed from another.

ROBERTS AND VERRAN.

June 22nd.—Present: six members and two visitors.

Best Methods of Working Fallow.—Mr. L. Cowley read the following paper on this subject:—''Fallowing should be commenced as soon as possible after seeding. By doing this the farmer will have the land ready to receive the benefit of the winter rains, and he is better able to clear up, and thoroughly work his land. The first working should be done with a five or six furrow plough, cutting to a depth of at least 4in. This is most important, as land which is not ploughed well cannot be converted into good fallow by later cultivation. The chief objects should be to thoroughly break the roots, and to expose the deeper sour soil to the air and sunlight. A mouldboard plough is preferable to a disc implement for the first working, as it breaks the roots better, pulls out more stumps, and cuts and turns the soil thoroughly. In this district, farmers are often handicapped through shortage of horse strength, but rather than plough the land too shallow, it would be advisable to use a plough cutting fewer furrows. If the land has a lot of bush, rubbish, &c., on it, it should be gone over with a scrub rake. Thus, not only is the land cleaned up, but the scrub rake acts as a good substitute for the harrows. If not raked, the fallow should be harrowed immediately after ploughing, but sandy land, which is inclined to drift, is better left unharrowed. Any rubbish, weeds, etc., which happen to start on the fallow should be kept fed off with sheep until later in the season, when a thorough working should be given to destroy all plants.

In this district, fallowing, and more particularly the working of fallow, has been sadly neglected, but in years like the last two it has been proved that fallow land is far superior to that not so treated. It is a great mistake to attempt more than can be properly cleared up and worked. It is good practice to cultivate and fallow in September and again with the first rains after harvest. The secondary cultivation need not be deep; a depth of 2in. is quite sufficient, so long as all weeds are properly cut and turned in. arned in. For working back, I prefer the twin plough to any The scarifier style cultivator would not be satisfactory in this other implement. country, as the land is mostly of a sandy nature, and weeds not turned right under, start growing again. It is most important that fallow should be harrowed frequently after rains, as this ensures the conservation of moisture. Thorough fallow cultivation is going to play a big part in the development of this country, and its importance should be properly recognised. Mr. F. Masters favored the use of the disc plough in new country, as too much labor was required to clear for the mouldboard implement. He thought working of fallow after harvest time was unneces-Mr. W. Sharman also preferred the disc plough, as it cut off a great number of shoots. Messrs. J. C. McCallum and H. P. Whittaker also spoke, and the majority of members favored the use of the skim plough for fallowing.

SALT CREEK.

June 26th.—Present: 11 members and four visitors.

FEEDING AND CARE OF FARM Horses.—In a paper on this subject, Mr. Geo. E. Barber said that the past season had taught farmers the value of conserving fodder for horses. Molasses mixed with crushed oats and cocky chaff made a good feed, and it had a medicinal value as well. However, when available, good hay chaff was best. Cocky chaff should not be thrown away, as it proved useful, in time of stress, to mix with hay chaff. The feed of horses should be varied according to the work they did. They should always be offered a drink when they came in from work.

YABMANA (Average annual rainfall, 15.14in.).

June 26th.—Present: 11 members and two visitors.

COLT-BREAKING.—Mr. A. M. Robertson read a paper on this subject. breaking-in of a colt should be undertaken when it was 24 years old; at that age the colt would be found to be more tractable, and would learn more quickly. crush pen should be employed to catch the animal for the first time, to avoid the possibility of its injuring itself. A strong rope should be used for tying up the If a colt once succeeded in escaping it would make an attempt whenever it was tied up. Mouthing was very important. To do this, a rein should be fastened to one side of the bit, passed under the jaw, and through the ring on the other side of the bit. The animal should then be run around until it yielded easily to tension placed on the rein. The process should then be repeated for the A newly-broken colt should be used for light work only for the first When breaking into double harness a steady, quiet horse should be put in with the colt. Mr. Crittenden was of opinion that a draught colt should not be broken in until 3½ years, and a light colt 4 years. Mr. T. G. Strother said the breaking-in age should depend upon the condition of the colt. For the purpose of mouthing, members generally preferred the practice of putting a sureingle around the colt and tying back the head first on one side and then on the other.

RABBIT DESTRUCTION.—Mr. G. W. Story read a paper on this subject. Members agreed that trapping and fumigating were the most efficacious methods of destruction.

YALLUNDA (Average annual rainfall, 18in. to 19in.).

June 27th.—Present: 11 members.

SHEEP ON THE FARM.—In a paper on this subject, Mr. W. Cabot recommended farmers to take up the keeping and breeding of sheep. Sheep thrived under conditions which were often too severe for other stock, and they did not require very much attention. Only limited capital was required, and returns were made very

quickly, both on wool and meat. It was also a great advantage for the farmer to be able to supply his own requirements of meat. Sheep were very valuable in assisting in the destruction of weeds, and also of various shoots that grew on scrub land. The land on which they grazed was also greatly improved by the manure which they left. Discussion followed.

YEELANNA.

July 3rd.—Present: 10 members.

OAT-GROWING AND SHEEP ON THE FARM .- In a paper with this title, Mr. S. A. Wilkin said that on mallee land the growing of oats could well be combined with the keeping of sheep. Oats, on new land, often yielded more heavily than wheat, and oaten hay was more nutritious than wheaten hay. The inclusion of this cereal in a crop rotation assisted in keeping the land free from "takeall." Fraw provided an excellent stubble burn, which greatly assisted in the destruction of mallee shoots. A self-sown crop was usually available in the succeeding year, and this provided good feed for sheep; sheep would be found very useful in keeping the fallow free of weeds. Merino ewes mated with either English Leicester or Lincoln rams would provide the best lambs. If sheep were kept the farm needed to be well fenced and subdivided into suitable paddocks. In the summer months sheep required to have free access to water. Fodder crops such as rape and mustard, could be sown on fallow land. Sheep would do well on these crops, and the fallow would be improved by the droppings left. They would be found to eat quite a number of the small bushes and shrubs which grew in the mallee, and would thrive where horses and cattle could not exist. A certain amount of attention required to be given them in the direction of dipping, branding, &c. Discussion followed the reading of the paper.

YEELANNA.

FALLOWING.—In a paper on this subject, Mr. Carey said that fallowing should The implements should receive attention bebe commenced as early as possible. fore starting operations, to see that they were capable of doing the best work. It was better that the plough should cut too little ground than too much, to obtain The depth to which land should be ploughed depended on the the best results. quality of the soil, but 3in. to 4in. would be a fair average depth. Stiff land should receive extra cultivation so that it might be more easily worked in later operations. After good rains the fallow should be harrowed to conserve as much moisture as possible. Members discussed the paper, and agreed that early and deep ploughing was to be recommended for their district.

BUTLER, May 24th .- The subject of "Co-operation" was introduced, and discussed by members.

CARROW, June 30th.—Co-operation.—Mr. F. J. Anear introduced this subject, and after some debate, the discussion was adjourned until the next meeting. IMPROVEMENT OF DAIRY STOCK .- This subject was also discussed. hoped that some improvement in the standard of dairy stock kept by farmers would

be effected, as the need for such improvement was very marked.

COORABIE, April 3rd.—The scheme for the provision of a permanent and convenient supply of stock water near the township of Fowler's Bay was given further consideration. It was decided to call for tenders for the requirements connected with the proposal.

COORABIE, May 29th .- Mr. Stretton asked for an explanation of the fact that his drill did not work evenly, one side of it doing better work than the other. Members thought it was probably due to neglecting to raise the discs when turning corners with the drill.

Co-operation .- The Hon. Secretary (Mr. H. V. Hobbs) introduced this subject, and read from the Journal two papers which were contributed at last Congress. After some debate, it was decided to re-introduce the subject at the next meeting for full discussion.

GREEN PATCH, June 21st.—Co-operation.—This subject was discussed by members, who feared that the difficulty of financing the co-operative purchase of farm supplies would be the chief obstacle to the success of the scheme.

MOUNT HOPE, July 9th.—Being the inaugural meeting of the Branch, the election of officers took place, and a committee was appointed to arrange a programme of meetings.

PETINA, June 12th.—The Chairman (Mr. W. Penna) read a paper from the *Journal*, dealing with experiments with fertilizers carried on at Coorabie, hundred of Wookata. A lengthy discussion followed.

PETINA, July 17th.—Mr. D. T. Kenny read a paper in which he gave observations relating to the recent drought. He mentioned the difficulty he had had with horses, and the good effects which had followed putting them on the growing wheat crops. The wheats which had given most satisfaction last year were Early Gluyas, Federation, and Baroota Wonder.

YADNARIE, June 23rd.—Annual Meeting.—The Hon. Secretary (Mr. J. H. Kruger) read the annual report, which showed that 12 meetings had been held during the preceding 12 months, and the average attendance of members per meeting was 16.

EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES)

BORRIKA.

June 26th.—Present: 15 members and four visitors.

Horse-breeding.—Mr. Hart read a paper on this subject. Owing to the drought and other causes, he said, they were faced with a serious shortage of horses. It would, therefore, be found profitable for farmers to breed horses for their own requirements. For the work required of them in their country, they should breed a nuggetty type of draught horses. To improve the quality of the present stock they should secure the use of good draught stallions. He favored mares of the Clydesdale breed. They should be served in September to secure early foals. In discussing the paper, Mr. Weber said he had found the breeding of horses very profitable, and the practice did not interfere with ordinary farm work to any degree, as the mares could be worked almost up to the time of foaling. He favored the use of stallions of the Suffolk Punch breed.

BRINKLEY.

June 26th.—Present: seven members.

Fodder.—In a paper on this subject, Mr. W. Pearson said that the past season had impressed farmers and pastoralists with the importance of conserving fodder for times of scarcity. Wherever possible, straw should be reserved, as it was a very useful fodder when hay was scarce. Cocky chaff, also, was of considerable value for adding to the food ration. It was good practice to cut wheat with the binder, and harvest the grain with a thresher. A better grain sample was secured, and the straw could be converted into very good chaff. When this practice was followed all weeds were also removed from the land. Cocky chaff could be safely stored by putting it into a wire netting enclosure and covering it first with a layer of broom and then with straw. Mr. Wilhelm recommended the building of a permanent shed for storing cocky chaff. Mr. Schulze advised the feeding of oats, unwinnowed, with chaff. Members thought that straw could well be stacked in the paddocks, and left for the stock to help themselves.

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

June 21st.—Present: eight members and one visitor.

Judging at Shows.—The Hon. Secretary (Mr. D. P. McCormack) read a paper on this topic. He said that the present system of judging adopted at most shows had often provoked the unfavorable criticism, not only of exhibitors, but also of the general public. People often wished to know the reasons which justified an award to some particular animal or article, but they could get no satisfaction. One of the objects of live stock shows was to encourage the production of a better class of stock, but if competitors and others interested were not made acquainted with the points taken into consideration by the judges, they learnt no lessons from the results of the competition. Judging should be conducted on a recognised basis of awarding points, and he thought the Government should subsidise only those societies which adopted the system. His experience with the Northern Yorke's Peninsula Field Trial Society had convinced him that this method was the most satisfactory to all concerned, and had proved a real educational factor. There were many advantages pertaining to the system, and they would outweigh any additional expense which might be involved in its adoption. Mr. Gray suggested that the Government should fix standard scales of points for the judging of different classes, to be used by all societies, and a motion was unanimously carried to that effect.

GERANIUM (Average annual rainfall, 16in. to 17in.).

July 9th.—Present: 14 members and three visitors.

Fencing.—This subject was dealt with in a paper by Mr. F. Norton. vised farmers in this district to systematically plan their fencing, with a definite objective in view, according to their intention to practise cereal growing only, sheep and cereal growing, or general mixed farming. There was no natural timber suitable for fencing purposes growing in the district, therefore they could possibly turn other resources to account. "We have sand, lime, gravel, &c., in abundance," the paper continued. "These, with cement and steel, or any old wire lying about would make posts, light and durable. With iron standards, our fences would be imperishable and safe against fire. In parts of the world these artificial posts are being manufactured and traded in commercially. Concrete mixers are a practical proposition where there is engine power on the farm, and many are making their own. With different classes of moulds one could make many are making their own. With them any length, diameter, or shape. This is certainly worth considering where Of the different classes of material usually at comone has much fencing to do. mand for timber for posts, there are the gums (the red gum is considered to be the best), and the pine (which is procurable at Moorlands and Tailem Bend). These, to my mind are as serviceable and cheap as anything else we are able to The pine from Tailem Bend is grown on limestone, and is hard and solid, and if charred appears to be proof against white ants, light to handle, and durable. In iron standards we have T, angle, and flat iron, all can be purchased at any length and gauge required. The same applies to barb and plain wire, and short swing droppers. My idea of the fence most economical and convenient for a mixed farm (and our climate and soil make this the most suitable class of farming) is as follows:-Boundary fences should be 3ft. 6in. high, of three wires, with a view to making them six for sheep; 14 gauge barb should be put on top, the balance being plain wires. Galvanized steel wires, which are rust-proof, should be used. Strainers—the stouter the better within reason—should be 7ft. long. This allows for 3ft. in the ground and 4ft. out, which gives 6in. over the top wire. I find 10 chains apart a reasonable distance between strainers. Put the heaviest, straightest, and best on corners and gates; the lighter ones can be used as running strainers. Ordinary wood posts, one chain apart, are best on boundary fences, but one every two chains would be sufficient for division fences. The distances between the wires for a six-wire fence which I find most suitable are 11in., 8in., 6in., 6in., 6in., 5in. This makes 4ft. 6in. over all for standards. I have found the angle iron standard very unsatisfactory, as when they bend they are difficult to straighten without breaking. My late experience has proved flat iron to be better in many ways than T, besides being cheaper. The T, when bent, does not stand straightening to the extent flat iron does. The latter appear to be of better quality material. on the heavy side, they will stand fairly rough usage. I find lin. x in. fairly satisfactory; 1in. x in. would be better, perhaps. Where the mallee bush abuts on any road boundary of the section, a fence of one barbed and four plain wires 3ft. 4in. high, with posts two chains apart, and nine standards between each, which means 10 spans of practically 13ft. is sufficient. Sheep very rarely attempt to get between wires, it is generally underneath; so where there are any hollows, these could be filled with stumps. I mention this for economy, but where one can afford it a 3ft. 6in. fence with six wires and posts a chain apart with standards every 13ft. will in the end give more satisfaction, especially where crossbred sheep are I find a good plan in this country with sheep, until one is in the position to properly fence his holding, is to have half a mile or more of 2ft. 6in. pig netting and a few T posts for temporary division fences. This, with a barb on top to keep eattle from pushing it over, and wooden posts on the light side for quick handling, about four chains apart, can be quickly erected. Two good men can erect half a mile per day. This fence can be moved about where required. One of the important factors in carrying sheep profitably is to make them eat off where they are wanted to, and not where they like. A plan I have adopted, which affects a great saving of time in moving implements from one paddock to another, is to make openings 22ft, wide. In the centre of the opening I place a block of wood 18in. in the ground, and with 3in. out. In a 9in. deep hole in the centre of this I place a T iron post. This acts as a fairly rigid temporary upright. Two gates. each 10ft. 6in. wide, can be hung to permanent gate posts. There should be a loop over the top to connect in the centre, and a loop of wire on each side of the bottom of the stump post in which to place the bottom of the gate standard. The gates can be made with pig netting; barb wire on top, and one piece of straight mallee about the size of a pick handle at each end, and one in the centre. This makes a fairly serviceable and very handy gate. One side can be left up and the other used for going in and out with the cart, dray, &c., but with a team of eight horses and wagon or implement both can be taken down and the team driven right through without unhitching, which is a great saving of time." Members discussed the paper, and expressed various opinions on the best distance apart to place strainers, the relative value of concrete and other posts, &c.

HALIDON.

June 23rd.—Present: 15 members.

ANNUAL MEETING.—The Hon. Secretary, Mr. W. F. D. Clarke, read the annual report for the preceding 12 months. The Branch was inaugurated in June, 1914, and 10 meetings had been held during the year of its existence. The average attendance per meeting was 13. A library had been formed, and volumes purchased had been circulated among members. Experimental plots were laid down last season, but, owing to the drought, no results were obtained. This work, however, was being continued in the present season.

Fallowing.—Mr. C. A. Russell contributed a paper, which is to be submitted at the Tailem Bend Conference in July.

HALIDON.

July 21st.—Present: 10 members and four visitors.

Co-operation.—After reading the papers on this subject read at the last Congress, Mr. J. M. Braithwaite addressed the meeting. He referred to the milling value of South Australian wheat, and thought the prices received by the farmer were not commensurate with this. The difference between the cost of production of agricultural implements and their sale price was too great. This was in part due to the cost of agency, advertising, and distribution. The price to the farmer could be reduced by the formation of a co-operative association that would manufacture and sell direct. Mr. Neville (a visitor from Wilkawatt) agreed that the only way to reduce the price of implements was

for the farmers to join together and make them themselves. Although South Australian wheat had enjoyed a good reputation in England, it was losing it because the farmers were becoming so careless with regard to the samples they marketed. They could not expect better prices unless they offered better samples. If the system of bulk handling were adopted, that would solve the difficulty. Mr. Weste (chairman) thought farmers could co-operate with advantage in selling wheat and in the purchase of cornsacks, super., &c., but was afraid any scheme for the establishment of a co-operative implement factory would be doomed to failure. The various implement makers, by years of work, had perfected the various implements, and it would be necessary for the co-operative factory not only to produce as good implements, but to convince the farmers that they were as good. Every farmer had his own fancy with regard to implements, and it would be impossible to cater for all tastes. Other members thought co-operation could be adopted with advantage. The local resident agents of the various firms were very useful, and well earned their small commission, and it would be unfair to expect the Bureau Secretary to do all their work for nothing. It was decided that the delegates should recommend Congress to appoint a committee to thoroughly go into the question of co-operation.

MANTUNG.

July 1st.—Present: nine members and two visitors.

CO-OPERATION.—The Hon. Secretary (Mr. L. J. Pearce) introduced this subject. He thought Branches of the Bureau should guarantee payment of instalments on purchases for members. Mr. F. W. Pearce said that this would necessitate the establishment of a sinking fund. Mr. Hannaford did not favor the proposal that the Branches should guarantee payments. Messrs. Lehmann and A. Tonkin also spoke in favor of co-operation. It was decided to direct delegates to Congress to vote in favor of a co-operative system.

MINDARIE.

June 7th.—Present: five members.

FEEDING OFF CROPS.—Mr. Johnston read a paper on the above subject. In the mallee country, where natural feed was very scarce, farmers often fed off their cereal crops, but he did not think this advisable. The yield was rarely, if ever, so good after feeding off, but of course it depended very much on the season. If farmers wished to feed off their crops he advised them to do so before the end of June; otherwise they were staking everything on late rains. He advised every farmer to sow barley or rye for early feed, in preference to letting their stock run over the crop. These two cereals made very rapid growth, and provided a large amount of feed. Members generally agreed with the writer of the paper.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.). June 26th.

HARVESTER V. BINDER AND THRESHER.—The Chairman, Mr. G. Patterson, read an extract from a paper dealing with the relative cost of harvesting with the combined harvester and the binder and thresher. Mr. C. Thiele commented on the paper, and said that the harvester was the most suitable machine for use in their district.

MURRAY BRIDGE.

June 21st.—Present: 17 members and two visitors.

REPLENISHING THE STOCK SUPPLY.—In a paper with this title, Mr. J. H. Lehmann said that in reviewing the drought and its effect upon the live stock of the State, one could not fail to be impressed with the importance of stocking lands

with stock of good quality, carefully avoiding overstocking; the breeding of a large number of animals showing neither size nor quality must be unprofitable on account of the poor market value of the product. By breeding small numbers greater care and attention could be given, and good prices would be secured. nection with horse-breeding, the breeder should have in mind the purpose for which the horse was required. If draught stock were desired, those mares should be selected which showed draught quality-good conformation, with a healthy constitution—mating them with sires similarly desirable. It was more profitable to pay a few pounds extra for a good sire than to breed from an inferior animal. Weedy and inferior mares should never be bred from, inasmuch as the cost of rearing their progeny often exceeded the market value of the animals. called forth considerable discussion. Mr. Jenkins considered that the small holder must be practical before all things. The cost would prevent him considering pedigree, and good results and high prices were gained by breeders who gave little thought to the ancestors of his herd.

MYPOLONGA.

June 21st.—Present: 16 members and five visitors.

VEGETABLE GROWING.—In a paper on this subject, Mr. M. Rayner said the essential factor in growing vegetables was the planting of good, sound, reliable seed. The ground should be worked to a very fine tilth, and the seed should not be buried too deeply. The soil should be pressed firmly around young cabbage and cauliflower plants which were being transplanted, and shade should be provided for the first few days. Farmyard manure was most suitable for vegetables of the cabbage type, whilst root crops, such as carrots, were best dressed with bonedust or super. Mr. H. Guenther had found that he could not successfully germinate onion seed except by sowing it on the surface and covering with wet bags for a couple of days.

PARILLA WELL (Average annual rainfall, 16in. to 17in.).

June 2nd.—Present: 11 members and one visitor.

CONSERVATION OF FODDER .- Mr. J. W. Johnston read a paper on this subject. He said that on every farm a reserve of hay should be built up sufficient to carry the stock through for 12 months. The feeding value of cocky chaff, mixed with hay chaff, should also be recognised. Out crops should be cut with the binder, and headed, and a proportion of the wheat crop could also be dealt with similarly. This would furnish a supply of straw, which would be found very valuable in times of scarcity. Where it was possible to irrigate successfully, lucerne, sorghum, millet, or maize should be grown. If such provision were made by farmers, they would not find it necessary to send their stock away to keep them alive. Ferguson also contributed a paper on the same subject. He said there were disadvantages attached to the reservation of quantities of hay above normal require-These represented money earning no interest. Extra labor was involved in shifting the hay when required for chaffing. Cocky chaff could be easily preserved by putting it in a large heap and protecting with straw, but it had little feeding value in itself, and extra labor was involved in winnowing when it was intended to make use of it. Feed oats could be easily stored, and would prove a valuable addition to the ration. By threshing and heading cereal crops quantities of straw would be secured which would prove useful, but the expense of machinery and additional labor must not be overlooked. The growth of fodder crops such as lucerne was of great importance. A small area of lucerne, well established, would provide feed for a good number of stock. A good supply of water and proper attention were essential to successful lucerne growing. This fodder had a high feeding value. Where it was impossible to grow lucerne he recommended feeding cocky chaff and oats. Both papers were well discussed by members.

PARILLA WELL (Average annual rainfall, 16in. to 17in.).

June 24th.—Present: 13 members.

Fallowing.—Mr. H. Austin read a paper on this subject. He said that shallow cultivation should be adopted on the flat land in dry seasons, but a good average depth for ploughing was 3in. For sandhills ploughing should be about 5in. deep in order to avoid having the loose soil on the surface. Fallowing should be commenced immediately after seeding, in order that the winter rains should be conserved in the soil. Harrowing should follow after the ploughing, and sheep-could be recommended for packing the ground. They would keep the land free of weeds, and their droppings would increase the organic matter in the soil. Harrowing should be done after a fall of rain, and the operation should be repeated as frequently as possible until the advent of the hot weather. Preparatory to the seeding of the fallow land, a good working should be given with a time cultivator; followed by the harrows, a good seed bed would be prepared. If the seed were sown dry the land should not be harrowed immediately afterwards. Messrs. A. Inkster, J. S. Ferguson, and J. W. Johnson supported shallow but thorough cultivation. Mr. Johnston said that summer fallowing would not be a success in their country. In a discussion regarding varieties of wheat suitable to the district, Mr. Ferguson favored Gluyas, and Mr. Johnston recommended Walker's Wonder and Marshall's No. 3.

PARILLA (Average annual rainfall, 16in. to 17in.).

June 25th.—Present: 10 members and 13 visitors.

TREE PLANTING.—In a paper on this subject, Mr. R. B. Dauncey said that ground on which it was intended to plant trees should be ploughed to a depth of 6in. The trees should be planted in rows 16ft. apart, with a space of 8ft. between the trees in each row. He suggested the planting of an area of 10 or 20 acres near the homestead. This would provide a splendid breakwind. Where the house was situated away from the road an avenue of trees along the drive would add an attractive appearance to the home. Young trees when planted should be surrounded with mould and pressed down tightly. Loose earth should then be placed around them. For that district, he recommended sugar gums, red and blue gums, and pines; the pines should be planted during the month of June, and the gums during August or September. Mr. J. Tee recommended the planting of a plot of trees to provide shelter for stock. Almond trees were both useful and profitable. Mr. G. E. Gregory suggested that sugar gums should be lopped, which caused them to reshoot, and provide good breaks. Carob trees would act as shelter trees, and also provide stock feed. Mr. M. Shannon said that gum trees not be planted near orchards, as they would injuriously affect the latter. Ornamental trees could well be planted in the corners of paddocks. Mr. H. G. Johnston said large holes should be dug for the trees, which should be placed about a half-chain apart. Messrs. Millstead, Gray, Keiley, and Brown also spoke.

PINNAROO (Average annual rainfall, 16.74in.).

June 25th.—Present: 16 members.

OATS ON MALLEE LAND.—In a paper on this subject, Mr. H. Ledger said that a considerable portion of the land lying between the Pinnaroo railway line and the River Murray would, when properly cleared, grow wheat profitably on the flatter country, but the great number of big sandhills would make it heavy and expensive working. Algerian oats would be of the greatest assistance in making the country a profitable venture for the settler and the State. The land should be rolled and burnt off, and a good portion of it sown with oats; as oaten straw was very inflammable, a good burn could be secured, and this was one of the chief factors to success in new mallee country. Oats in a good season could be purchased at 1s. 6d. per bushel, and a sowing of one to one and a quarter bushels per acre would produce a good crop of straw in a fair season. If the crop could be reaped so much the better, but oats were very liable to go down, which made it unwise to sow too large an area. In any case there would be ample seed left in the ground for the following year's crop. Ewes and lambs would do remarkably well on green oats, and dairy cows grazing on them would produce butter of excel-

lent quality. Grown extensively, on the vast area of inferior mallee lands, this crop would be the means of materially helping to keep up a constant and regular supply of meat and dairy produce. It was recognised to be the best feed for working horses; crushed, it made good feed for dairy cows; and it was claimed that 21bs. of oats a day would fatten a wether. A good quantity of oats stored away in bulk would be a stand-by in lean years. Sown on their sandy country and fed down, but not too closely, they would prevent a good deal of drift without affecting the value of the land from a wheatgrowing standpoint. Mr. F. H. Edwards said that one of the best oat crops he had seen in their district was grown on land which was regarded as very poor. For the purpose of securing a good burn, he knew of nothing better than oats. For fodder purposes, he specially advocated rye. Mr. P. J. Edwards said that stock did not take too readily to oats in the growing stage, also when cut too early for hay purposes. Mr. H. G. Fewings was doubtful about the prospect of farming profitably all that land of the poorer class referred to, owing to the difficulty of controlling the shoots. Mr. Jas. Scales believed that it was essential to grow oats as well as wheat. By the sowing of oats, the risk of ''take-all'' was minimised, and it added to the yield of subsequent wheat crops. He favored a rotation of oats, fallow, wheat. Mr. R. Edwards said that, even the better classes of land in mallee districts would need to be sown with oats more extensively than had been the case in the past. Mr. L. J. R. Roper also spoke. Mr. Ledger, in replying to questions, said that if oats were first sown, one was almost assured of good stubbles for at least three years, and at the end of that period, shoots that were left would be so weakened as to make their extinction an easy matter. In reply to Mr. Scales, Mr. P. J. Edwards said that the Champion oats drilled quite as easily as wheat, but for yields could not be compared with Algerian. In chatting with a farmer resident on some of the poorer land that gentleman had exhibited oats with enormous "tails," and he (the speaker) wondered whether the class of land was responsible for such a growth. Mr. R. Edwards attributed the long "tails" to a slow pace in stripping, and to the method of cleaning. He advocated the use of motor winnowers, as the additional threshing removed the objectionable parts. Mr. F. H. Edwards thought it was the season and style of cleaning rather than the class of land which was responsible for long tails. When thorous experienced in drilling Algerian oats. When thoroughly threshed, no great difficulty should be

RENMARK (Average annual rainfall, 10.93in.).

June 3rd.—Present: 10 members and two visitors.

MANURING FOR PROFIT.-Mr. F. Cole read a paper on this subject. He said that profitable manuring of the soil was one of the most difficult problems orchardists had to solve. There was a tendency towards a universal use of phosphatic manures, growers very seldom supplying sufficient quantities of nitrogen and potash to form the balance of constituents for plant food. This was most important, and its neglect often caused a great waste of money. Trees and vines required, to produce good crops, a complete fertiliser containing phosphoric acid, nitrogen, and potash. How to tell just what kind and what quantity of fertilisers to apply to his land was one of those questions which the fruitgrower must answer for himself. Having studied the matter carefully, and having observed his trees or vines from day to day and year to year, he should be able to discover the treatment they needed. If the growth was strong and rapid the trees and vines produced too much wood, then nitrogenous manures should be discontinued, and potash applied. If the growth was not sufficient and the leaves were yellow and dropped early, nitrogen was required. The grower should also remember that the plants needed all the elements of plant growth, and not one of them alone. For example, a heavy application of nitrogen upon soil which was deficient in potash and phosphoric acid could not be expected to give useful results, and was extremely waste-In the same way the application of potash to soils which were poor in nitrogen or phosphoric acid would be comparatively useless. Nearly all heavy loams and clay lands contained plenty of potash, but it was very often in an unavailable Gypsum and good tillage released this. The fruitgrower should bear in mind that he should never rely exclusively on mineral and chemical foods, because

they contained no humus and the soil was apt to become hard and lifeless. There should be a judicious rotation in the application of manures; say one year chemical manures, the next animal, of which there were several forms-bonedust, bone and blood, blood manure, hashmagandy, &c. Greater satisfaction would be obtained from the use of these animal manures than from mineral and chemical manures in their soils, as they had naturally very little humus, as a result of continual cultiva-To get the best results from mineral manures they should tion in hot weather. be followed with a good dressing of stable manure. This course was impossible for universal adoption, as stable manure could not be obtained in sufficiently large quantities. In place of farmyard manure there were to be recommended first green manures, such as peas, lupines, and cow pea, which could be grown and ploughed under; and secondly the use of animal manures. If applying manure to clay lands that were flooded, it could be broadcasted or drilled in, as the water would carry it down; but in sandy slopes it was better to put it in a deep furrow next If broadcasted in this class of land it would not be disthe irrigation furrow. solved, unless succeeded by rainy weather. Perhaps the best method of applying manures was with the manure distributors fitted between the handles of the plough, by which means it was put in every furrow when ploughing. This spread the manure evenly, and put it down into the soil, where it carried out its functions without being disturbed Superphosphate, bone super, sulphur, or muriate of potash could be applied in late winter, but sulphate of ammonia and nitrate of soda only in the spring during the growing period; blood manures, early spring or late winter; bonedust, hashmagandy, and in fact all manures that required time to become incorporated with the soil, should be sown in the autumn; this would allow all the winter for decomposition. He had had very good results with orange and lemon trees by applying stable manure, sulphate of potash and bonedust. Experimenting was the safest method of finding out what class of manure certain lands required. He concluded by reading an extract from Bailey's Rural Science. Discussion ensued on the question of determining manure values, and the opinion was expressed that there was need for some simple rules to enable growers to assess the relative values of water soluble, citrate soluble, and acid soluble fertilizers. Mr. Basey said that experience had satisfied him that potash manures should never be used alone. There was no question of the value of stable manure. Splendid results had followed its use in the pear orchard. The land must be kept clean; otherwise the benefit was secured by weeds.

WOLLOWA.

June 24th.—Present: seven members and one visitor.

Prevention of Sand-drift.—In a paper on this subject, the Hon. Secretary (Mr. J. T. Simper) said that sand-drift could be avoided to a great degree in new districts by leaving a network of windbreaks of natural timber. Sandy land should not be worked in a dry condition, more particularly after seeding. The object should be to settle the fine soil down, leaving the lumpy material on top. Where drift occurred after drilling it was advisable to again sow the laud. Litter such as straw, stable manure, or even seaweed placed on the land would help to bind it. Where the drifting was so serious as to prevent cropping of cereals, pasture grasses should be sown; for this purpose he advised blue lupine, rye, buffalo, or marram grass; a light covering of straw should be placed on the land after sowing. Members discussed the paper, some contending that it was better to clear all the land, as otherwise the drift was liable to bury the timber left for wind-breaks. Some members considered that the land should not be harrowed after drilling.

WOLLOWA.

July 22nd .- Present: seven members.

THE FARM GARDEN.—Mr. G. R. McArthur read a paper on this subject, as follows:—"I confine my ideas to the value of a garden on the average mallee farm in new districts, where sufficient attention is not paid to the vegetable plot. Few people seem to realise the value of a farm garden. On many farms heaps of stable manure are left to waste in the yard, instead of being utilised

The selection of a suitable position plays a very imfor growing vegetables. portant part. Choose a gentle slope facing the sun, with a well-sheltered background on the nor'-west and westerly sides, for without the necessary shelter one can only expect a poor return for the work. Should there be no natural shelter, a wind break must be made; a broom bush fence answers this purpose very well. If the garden is established in an open paddock, as I have often seen, one severe gale will cut back perhaps a month's growth. Liquid manure is absolutely the best for forcing the growth of almost any young plants, especially cauliflower, cabbage, and lettuce. Take old kerosine buckets (or a carbide tin answers the purpose admirably), fill to about a third with stable manure or fowl manure (which is about the best of any), add a few handfuls of lime, and fill with water. Allow this to stand for a couple of days. Then, for young cauliflowers, &c., apply about a pint to each, say, once a week, but do not pour it on to the leaves. This will force the young plants on wonderfully. Do not be afraid to dig into the ground any quantity of stable manure, so long as it is well rotted. Always keep the manure well heaped up, so that it will rot quickly. If the heap is turned over once or twice heaped up, so that it will rot quickly. If the heap is turned over once or twice it will rot into a mouldy state in a few days. It is not advisable to dig dry manure into the ground in this dry climate, as it tends to dry the ground under A dressing of super. and bonedust raked in on the surface will be well worth the trouble and expense involved. The first year some ground may be a little sour, and this does not suit all plants. Yet new ground is what other plants seem to require. Peas may show a tendency to go off in patches on sour land, but onions, cabbages, cauliflowers, and any variety of melons, pumpkins, &c., will grow on new land. To secure good early tomato plants make a good hotbed of stable manure. without any carth, and plant the seeds thinly in this. In frosty weather cover the young plants with straw, or chaff Tomatoes are very sensitive to the cold, and when once they turn dark it takes them some time to come round again. When the plants are about 3in. or 4in. high, plant them out in holes about 18in. apart, filled with manure. Apply weak liquid manure when planting out. When the plants attain a fair size, put a good mulch of rotten straw around the roots. Do not water too frequently when the plants are flowering, as this prevents the fruit from setting. If they show a strong growth, pinch off the ends of the limbs. This will also help the fruit in setting. For early turnips sow about April. Either let them come up with the first rains, or good results may be obtained by sowing through the drill with the early green feed. These will grow rapidly before the ground becomes too cold. Carrots and parsnips require fairly loose ground, to enable the roots to go down deeply. They can be transplanted in showery weather. For beet and mangelds give the ground a light dressing of raw salt, if the land is not already salty, and transplant them about August. Any quantity of these vegetables may be put in, as they stand the dry weather very well, and are very useful for cows, pigs, and even poultry. Piemelons may be scattered broadcast and ploughed in on fallow or any sandy ground. They also are valuable where pigs and fowls are kept, and even fed to cows during the dry summer months. Pumpkins, watermelons, and marrows require more attention. They should be put in holes 18in deep, and filled with rotted manure. Keep the vines watered until they flower. Most varieties of rotted manure. Keep the vines watered until they flower. fruit trees require to be planted in July; the holes should be dug about 2ft. deep beforehand, and stable manure should be mixed with the earth. planting, cut off all damaged roots, and prune the limbs well back, only leaving about two buds on each branch. Care should be taken not to plant the tree any deeper than it was originally, or this will stunt it. couple of pounds of bonedust mixed in each hole will help to force the young tree for a year or so. When the trees are old enough to bear fruit, careful attention must be paid to the pruning. A few lessons in pruning, if one has an opportunity, will not be time wasted. A badly pruned tree may become altogether useless in a few years. If the water used for irrigation is not of the best, dig a shallow trench about 3ft, from the tree to take the water. not water in small quantities at frequent intervals, but apply plenty now and again, as light waterings will keep the roots too near the surface. Vines will do very well in sandy ground in mallee country. Bore water will not hurt

them in any way. It is best to train them in a trellis, from where the birds are likely to be troublesome, and cover with wire netting. I think they will co better on a trellis in the hot climates. As regards flowers, I will not venture an opinion, for want of experience; but nothing is more attractive and homelike than a nice flower garden in front of the house."

BERRI, June 28th.—The Hon. Secretary (Mr. W. R. Lewis) presented the annual report of the Branch, which showed that interest in Bureau work had been well sustained.

BOOKPURNONG EAST, June 26th.—Fallow.—Mr. K. O. Schulze read a paper on this topic. A good discussion followed, in which the merits of sheep and cultivation for the destruction of weeds were debated. Members favored deep cultivation of flats.

COOMANDOOK, June 26th.—Co-operation.—Mr. A. S. Chapman read a paper on this subject. Mr. R. Upton said that, in their district, they had proved, in the case of the purchase of superphosphate, that co-operation was successful, and advocated extension of that principle. Mr. Marsh favored local co-operation, which would be very profitable. He thought that the expenses connected with a co-operative concern on a large scale would be too high.

COONALPYN, July 23rd.—Prevention of Cruelty to Animals.—In an address on this subject, Mr. G. E. Venning mentioned common instances of cruelty to farm animals, and pointed out means of prevention. To avoid sore shoulders in the case of horses, he urged the importance of well-fitting collars, and recommended the use of the backband on the trace chains for all heavy team work. The delegates who were present at the Tailem Bend Conference reported on the business carried out on that occasion.

LAMEROO.—On page 1141 of the July issue are printed the results of some experimental tests carried out by Mr. A. J. A. Koch. The figures given as the yields are incorrect; the plots have not yet been reaped.

LAMEROO, July 10th.—Annual Meeting.—The Hon. Secretary (Mr. E. T. Wray) presented the annual report of the Branch for the year. Ten meetings had been held, and the average attendance per meeting was 16. A wide range of subjects had been covered in the year's meetings.

MANTUNG.—The question of co-operation was discussed by members, who generally agreed with the principle.

PARRAKIE, June 19th.—Mr. Diener read a paper entitled "The Value of a Drought."

RAMCO, June 28th.—Manures for Old Apricot Trees and Vines.—In reply to a question from Mr. F. Lewis, Mr. Green recommended the following manure mixture for apricot trees:—4lbs. superphosphate, 2lbs. of sulphate of potash per tree applied in the winter, and 2½lbs. of sulphate of ammonia per tree applied in the spring. For vines, one-half of the above quantities would suffice. Trees or vines having healthy, dark-green foliage would require little sulphate of ammonia. Members advised the planting of crops such as field peas for supplying nitrogen to the soil.

RENMARK, July 8th.—Annual Meeting.—The Hon. Secretary (Mr. C. Styant-Browne) presented the annual report on the operations of the Branch during the previous 12 months. A number of useful and instructive papers had been contributed at the nine meetings held. The members had made a visit of inspection to Berri and Cobdogla, and noted the experimental work being carried out there. A successful pruning match had been recently held under the auspices of the Branch. Experimental work had been commenced during the past year, and it was proposed to continue same in the future.

SHERLOCK, June 26th.—RAINFALL RECORDS.—It was resolved that arrangements should be made for the registration of rainfall in the locality.

WAIKERIE, April 30th.—Mr. A. H. Headland contributed a paper on "Planting a Ten-acre Block." Members discussed the subject.

WYNARKA, June 26th.—English Farming.—Mr. F. H. Custance read a paper on this subject. He supplied English rainfall statistics, and explained the systems of cropping, manuring, and raising of livestock which were practised in England, and made a comparison with that work carried out by Australian farmers.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

May 17th.—Present: 10 members.

BEEKEEPING.-In a paper on this subject, Mr. J. Turner explained the functions of the queen, worker, and drone. The orchardist or gardener who desired to start beekeeping, he advised to procure from one to 10 hives, and gradually increase the number as knowledge and experience were acquired. These colonies, in Langstroth hives, should be secured in October or November. They should be placed fronting east, as the morning sun would then induce the bees to start work early. The hives should be raised about 8in. from the ground; this would ensure the absence of trouble with the bottoms rotting. Top stories should be placed on the hives during the honey season. The brood chamber should not be interfered with when extracting was in progress. It was unwise to disturb the bees frequently, especially during the winter. A bright, warm day was the best on which to work. If comb honey were sought, whilst a little extra work was involved in preparing the supers, the trouble of extracting was done away with. Wax attacked by the bee moth should be burned. The chief source of honey was the gum; lucerne was a good nectar producing plant, and supplies were also obtainable from many flowering shrubs. In discussing the paper, members thought that as the red and blue gum trees were destroyed, the industry would suffer. Honeysuckle honey was of little value, as it was almost black, and stringybark honey was also dark in color. Clovers and sages gave a succession of flowering, and yielded good honey. Bees could be profitably kept in an orchard, because of the immense amount of good they did in fertilising the fruit blossoms.

GUMERACHA (Average annual rainfall, 33.30in.).

June 21st .- Present: six members.

Charcoal Burning.—This subject was dealt with in a paper by Mr. W. F. Nickel. Charcoal burning was worthy of consideration, on account of the quantity of tree tops that needed to be cleared off the land, he said. The logs to be burned should be closely packed together, and then covered with earth, both ends being left open until they were fired, after which they should be covered. When the earth covering was sandy, the fire burned very slowly; this entailed attention for a lengthy period. Clay was unsuitable for this purpose. When burning was in progress, any holes caused by the earth falling in should be immediately filled. Some burners recommended the removal of portion of the coal every few days, but this involved a good deal of hot work, and a considerable volume of water was necessary. If the kiln were allowed to burn right out, the difficulty was that the earth was inclined to adhere to the coal. Members were impressed with this economical way of clearing their holdings of superfluous timber and logs.

INMAN VALLEY, June 23rd.—TILLAGE OF THE SOIL.—Mr. Nosworthy contributed a paper on this subject and a discussion by members followed.

KANMANTOO, June 26th.—The Hon. Secretary (Mr. E. W. Shepherd) presented the annual report. At all meetings throughout the preceding 12 months papers had been read, and profitable discussion resulted. The average attendance of members at each meeting was 13.

LONGWOOD, July 3rd.—Annual Meeting.—The annual meeting was held at Mr. Glyde's homestead. Members made an inspection of the orchard, where considerable damage had been caused by the flood. The Hon. Secretary (Mr. J. R. Coles) read the annual report for the year. Eleven meetings had been held, with good attendances, and good interest had been taken in the Bureau work.

MEADOWS, May 25th.—Co-operation.—The Chairman introduced this subject for discussion. Members did not favor the establishment of any further co-operative organisations. The Hon. Secretary (Mr. F. Nottage) read an article on the value of lime as an application to the soil. Mr. Nicolle tabled samples of rape and mustard, 10 weeks' growth, the former being about 2ft., and the latter about 2ft. 6in. in height.

MOUNT COMPASS, July 3rd.—Co-operation.—Mr. Jacobs introduced this subject, and a discussion followed. The matter was finally adjourned for further discussion at a later meeting.

MOUNT PLEASANT, July 9th.—Annual Meeting.—The Hon. Secretary (Mr. D. C. Maxwell) presented the annual report of the Branch for the preceding 12 months. This showed that eight meetings had been held during the period under review, and the average attendance of members per meeting was six.

PORT ELLIOT, July 17th.—The Hon. Secretary (Mr. H. B. Welch) presented the annual report of the Branch, which showed that 11 meetings had been held during the year.

SOUTH-EAST DISTRICT.

COONAWARRA.

June 22nd.

Wire Netting.—Mr. P. J. Lynch read a paper with this title. He traced the improvements which had been made in fencing up to the present time. When the danger of the rabbit pest was fully realised the use of wire netting became general, and Government assistance brought the use of it within the reach of all. Wire netting fences were also very useful for preventing the trespass of cattle, sheep, pigs and poultry. In the erection of the wire netting a galvanized No. 8 wire should be tightly strained along the top of the fence. To this should be attached one edge of the netting. For joining the ends of two rolls, they should be overlapped for 6in. or 8in., and a piece of wire should be threaded through the netting at the doubled portion. Trouble was often caused in endeavoring to make the netting wire hang evenly. To overcome this the top selvage of the netting should be tightly strained, and waves and bulges in the netting could then be corrected by cutting the bottom selvage occasionally and stretching the netting out as required. The heaviest netting of not more than 1½ in. mesh should be used. Six inches of it should be buried in the ground, and where necessary, extra pieces should be placed in burrows or hollows. Mr. Lynch then explained the terms on which netting could be secured from the district council.

KYBYBOLITE (Average annual rainfall, 22in.).

June 24th.—Present: nine members.

Mr. G. H. Hahn read a paper in which he emphasized the advisability of giving attention to details in connection with the work on the farm. Ploughs should be examined and corrected, if necessary, so that they would cut to the proper width. Oil holes in different machines should not be allowed to become choked. The harvesters and strippers should be thoroughly examined before each harvest, and new parts supplied, where necessary, to avoid delay in reaping. Gates and fences also should always be kept in thorough order.

MOUNT GAMBIER (Average annual rainfall, 32in.).

July 10th.—Present: 23 members.

Cultivation of Sugar Beet.—Mr. J. Livingston, M.H.R., delivered an address on this subject. He expressed the opinion that there was no finer tract of country for the growth of sugar beet than that from Kingston to Warrnambool. At Maffra he had seen a paddock of 100 acres, on which 400 sheep were doing remarkably well on the tops and leaves of the beet. This crop came in when others were working out, and one acre of it would produce more food for man and beast than any other product. In connection with Maffra, he stated that from 1,000 acres this season 8,844 tons of sugar beets were delivered to the factory, and this represented 4,400 tons of fodder in the way of tops and leaves from that source. From every ton of beets worked at the factory there resulted half a ton of pulp—sliced beets from which the sugar had been extracted. Thus there was also produced 4,400 tons of that excellent fodder, which in normal times had a food value of 7s. to 10s. per ton. According to one authority a 12-ton beet crop had the same fodder value as 8.2 tons of lucerne. He referred to the individual results achieved by growers, and quoted the statistics to show the quantity of sugar beet produced throughout the world. Members discussed the subject at some length. There was a diversity of opinion as to whether this crop would drain heavily on the land or not.

APPLICATION OF LIME TO THE SOIL.—Mr. A. H. Sassanowsky mentioned that sea sand at Warrnambool showed a content of 85 per cent. lime, and expressed the opinion that sand at MacDonnell Bay might compare favorably with this. He advised members to test the value of this as a dressing on their land. The President (Mr. Pritchard) recommended the application of 3cwt. of sea sand to the acre with the growing crop. A dressing for the grass paddock, to last for any time should be 1 to 1½ tons to the acre. Mr. Smith mentioned that he had applied a dressing of 3cwt. of lime per acre to a plot, but had noticed no result. Mr. Alcock said application of lime had not made startling differences in the crops, but the effect was more noticeable in the check which it gave sorrel.

KALANGADOO, June 12th.—Fodder Crops.—A discussion took place on the growing of fodder crops for stock. The Hon. Secretary (Mr. D. W. Tucker) said that rye which he had sown with the first rains in April was now carrying three ewes and lambs to the acre.

KALANGADOO, July 10th.—Annual Meeting.—The Hon. Secretary (Mr. D. W. Tucker) presented the annual report of the Branch, which showed that 11 meetings had been held during the year, and that interest in Bureau work had been well sustained.

MOUNT GAMBIER, July 17th.—Annual Meeting.—The Hon. Secretary (Mr. D. A. Collins) presented the annual report of the Branch for the preceding 12 months. Eleven meetings had been held with an average attendance of 18 members at each. Instructive papers had been contributed, and good discussions taken place, and the interest in Bureau work had been well maintained.

TATIARA, July 3rd.—Annual Meeting.—The Hon. Secretary (Mr. T. Stanton) read the annual report of the Branch for the preceding year. Ten meetings were held, at which the average attendance of members was 11.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, farey, foot and mouth disease, glanders, lice, pants (or contagious pneumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days, whilst that officer is away in the country.

Poisoning Parrots.

In reply to an inquiry for a method of poisoning grain for destroying parrots, which nibbled at the grain and did not swallow it whole, the Government Analyst (Mr. W. Hargreaves, M.A.) said the best way was to use 6lbs. wheat, 1 dram strychnine, ½oz. glacial acetic acid, 4oz. water. The acetic acid should be mixed with the 4oz. of water and the strychnine dissolved in the diluted acetic acid. The wheat, with the strychnine solution, should then be shaken in a vessel until the whole of the solution was absorbed. It should then be spread out in a thin layer to dry.

War Census.

At the request of the Commonwealth Government attention is drawn to the fact, in connection with the War Census, that a personal card must be filled in by every male aged 18 and under 60. A wealth and income card must be filled in by every person aged 18 and upwards possessed of property or holding property on trust, or in receipt of income, and by the representatives of companies and associations, unions, clubs, societies, institutions, religious bodies,

absentees, etc. Where a person has property or income of his own and is also required to furnish a return as a trustee or as a representative of a company or association, etc., a separate card must be supplied by him in each capacity. Cards and addressed envelopes for transmission are available at all post offices throughout Australia. The completed cards must be posted to the Commonwealth Statistician as early as possible, and not later than September 15th, 1915, except in cases where supply has not reached the local post office before September 6th, 1915. In such cases cards must be posted not more than ten days after supply reaches the local post office. No postage is required on the envelope containing war census cards addressed to the Commonwealth Statistician. Failure to furnish a return, or wilful inaccuracy in any return, renders the person concerned liable to a penalty of £50, or three months' imprisonment, or both, if prosecuted summarily, or a penalty of £500, or one year's imprisonment, or both, if prosecuted on indictment. Detailed instructions for filling in war census cards may be seen at all post offices.

Stallions Slow at Service.

A number of letters have been received from different parts of the State which indicate a disinclination on the part of stallions to serve mares. "This condition," says Mr. Place, B.V.Sc., M.R.C.V.S., the Government Veterinary Lecturer, "points to the cooling effect of the very quick growth of green feed, which this year, instead of acting as a flush, has a further effect of quieting down. The prevalence of coursobs is very likely also concerned in the matter, as the acid juice of these plants has a sedative effect on sexual desire. Drugs are not to be recommended in such cases; in fact, they are useless or worse. There is a German preparation known as yohimbin, prepared from an African plant, which is sometimes used, but the writer does not recommend it. Stimulating food, especially oats, will probably remedy the defect, and a flat tablespoon of red pepper in the feed once or twice a day will do no harm."

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

STOCK INQUIRIES.

Replies by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"M.J.M.," Owen, reports that the hoofs of a number of his draught horses have become dry and brittle, breaking off and cracking.

Reply—They may be over corned, and green feed will do them good in this respect. Ten drops of tincture arsenicum on the tongue once a day for a fortnight will also do good. Mix equal parts of castor oil, mutton fat, and Stockholm tar by warming together and brush well into hoofs daily. When badly broken for shocing side clips may help.

"E.G.T.," Hawker, reports the death of a six-year-old mare through flatulent colic.

Reply—As a result of green feed. Full details of the treatment of this have appeared in the Journal of Agriculture, under the heading of digestive diseases of the horse. It is not safe to tap a horse with a knife, as peritonitis generally sets in; it is much more satisfactory to give large soapy enemas after having emptied the lower-bowel, back raked. Half a pint of spirit, preferably gin, in a similar quantity of warm water, with 25 to 30 drops of essence of peppermint is most successful in such cases, and may be repeated in half an hour if necessary. Also a teaspoonful of household ammonia in a little cold water thrown into the mouth relieves. Briskly rub the flanks as well. When a horse is tapped it should be with a specially-made curved trochar and canula, which is no larger than a straw, and is inserted on the off (right) side at the height of the swelling on the flank, thereby entering the execum or blind gut.

"W.K.," Verran, has a horse which sprained its hind fetlock, leaving a swelling above the joint. Two blisters have not removed the swelling, which seems to be soft and under the sinew. The horse walks all right, but is lame at the trot.

Reply—The swelling is a distended oil bag (synovial bursa), and to open it with a knife would probably be to ruin the horse altogether. The Agricultural Department does not dispense medicines, which, in your case, could be obtained from chemists at Cowell, Tumby, or Lincoln, and will not do much good probably. The horse should have three months spell on green feed, and a pitch bandage tightly applied over the joint. This is made by warming together equal parts of Burgundy pitch, Stockholm tar, and Venice turpentine, smearing thickly on the leg, putting bits of wool on it all round, more mixture, and a tight bandage also smeared with mixture outside all.

"R. Bros.," Koppio, report that a stallion has a growth on haw, or third eyelid.

Reply—Although the growth is technically a form of cancer, it is not likely to affect the animal seriously. It should be painted with a 5 per cent. solution cocaine, pulled well out with forceps or suture, and cut off, taking some healthy tissue with it, the wound should then be cauterised with nitrate of silver.

"F.N.," Meadows, seeks (a) information relating to a cow which suffered a prolapse of the uterus after the first calf, and (b) cause and cure for a hard lump in the teat of a sow.

Reply—The accident need not occur again, but it would be advisable to watch her well at and for some hours after calving. For a fortnight before calving it would be well to give her every evening on the tongue 10 drops of tineture of pulsatilla. The lump in the sow's teat is probably the result of an abscess. No treatment is desirable beyond fomenting with soapsuds.

"C.G.," Lameroo, has a horse with its penis swollen like a small football; supposed to be due to the bite of an insect.

Reply—If such is the case, the swelling will go down with the hot fomentations being given; if otherwise it will be well to give the horse 15 drops of tincture camphor twice a day for a few days as well.

"A.J.D.," Willaston, reports a horse as having had strangles last year. A fresh swelling developed two months ago behind jaw, affecting breathing, and the horse is losing condition. Little boils occur in other parts.

Reply—The fresh swelling is due to remains of the previous attacks, as are also the little boils. Every day, rub into the swelling a bit of blue mercurial ointment as big as a small walnut, and give twice a day on the tongue as much as will lie flat on a threepenny piece of trituration of arsenicum iodide 3x. A fortnight's treatment should have the desired effect.

"E.W.P.," Koppio, reports that a cow calved fourth calf six weeks ago, and since has had difficulty in passing water, till now she can hardly do so, and is very stiff in hind quarters and is losing a hind quarter of udder.

Reply—The symptoms rather point to tuberculosis of the womb and glands of the hind quarter, in which case treatment would not do good. The case should be reported to the Chief Inspector of Stock, Adelaide, who would deal with it on its merits.

The same correspondent also writes that an 18-months-old steer, after a severe thunderstorm, seemed paralysed; after being driven a short distance it loses the use of one hind leg, and falls; after a rest gets up and proceeds a few chains and over again.

Reply—The symptoms point to four possibilities:—1, tuberculosis of the brain; 2, lightning stroke; 3, yacca poisoning; 4, thrombosis of an iliac artery. As it is impossible to say which without seeing the animal, probably the best course would be to destroy it and find out which of the four it is.

Port Broughton Agricultural Bureau report that a mare became lame in near arm, then swelling under belly, soft and pasty, muscle above shrunk.

Reply—Most probably damage to bone from a kick. Tr. arnica loz., methylated spirit 1 pint, and rub in twice a day, complete rest in paddock. Probably many months will be required to get better.

"B. Bros.," Koolunga, have a cow with swelling on rump, and ask if the animal can be safely used for beef if the affected part were cut right away.

Reply—The probability is that the enlargement is purely local, and could be cut out of the quarter when dressed; in any case it will be better to kill her, as she is ripe, rather than run her through the hot weather.

Morchard Agricultural Bureau report that a mare lifts a leg, as if affected with stringhalt, and has a painful swelling above inside hock and small lumps forming on bone.

Reply—Seems as if she were affected with spavin (lumps) and thoroughpin (swelling); breed and age are not quoted, so it is im-

possible to be certain. Rest the mare and blister the hock. The rest will do the good and the blister will ensure it.

"A.S.J.," Hill Town, reports that a horse has bruised the sole of its foot.

Reply—With a metal syringe inject daily as much spirit of iodine (iodine resub. 1 dram, methylated spirit 1 pint) as will go in the hole, then plug the hole with tow or wool dipped in Stockholm tar. This should put matters right in about a fortnight if there is no actual injury to bone, in which case the lameness is likely to be permanent.

"J.J.D.," Coulta, reports that sheep in district are affected by eyes bulging, then become blind; they either recover, or death occurs a few weeks later.

Reply—The blindness is the result of breaking down of blood cells by parasites which inhabit them; in the sheep that die the parasites win, and *vice versa*. Treatment:—Change of pasture, avoiding low scrubby country. If hand feeding is feasible an ounce of sulphate of iron to every ten sheep in feed helps, but is not necessary. To ease eyes, dust a small pinch of boracic acid into them occasionally. Do not let the sheep bite tight.

"W.P.," Alawoona, has a mare with a lump on near side of chest, occurred during scrub rolling.

Reply—It is more than probable that something has penetrated, as sticks often do, without leaving any outward sign. It would be well to foment with hot water till as soft as possible, then try and discover if anything can be felt; if not, cut into the swelling and feel all round with the fingers, remove object if found, and treat wound daily with spirit of iodine. The mare may be worked while healing.

"M.L.," Hornsdale, has a four-year-old gelding, in good condition, but slow in movement, eats slowly, does not draw when passing water.

Reply—It is not likely that there is serious kidney trouble in so young a horse, but as he is teething he is probably upset. Put on his tongue once a day for a few days as much grey powder (mercury and chalk) as will lie on a sixpence. Draw his penis and wash out sheath with warm water and soap, and he will probably improve.

"W.H.," Spalding, has a young sow which has broken out in sores and is troubled with itch and ticks.

Reply—The so-called tick on the pig is a louse, the largest of his tribe, and this is the cause of the trouble here. Spray with any liquid sheep dip and oil afterwards with raw linseed oil and sulphur,

50 to 1. The oiling may be repeated with advantage daily for three days. Then spray once a fortnight for a few times. Burn all litter, spray out the house with boiling water and soap or 5 per cent. coal tar disinfectant. Feed cinders with food.

Hartley Agricultural Bureau ask for a description of the symptoms of a mare carrying a dead foal.

Reply—The symptoms vary according to the temperament of the mare and the age of the foal. Usually the mare is not herself in appetite and manner, there may or may not be discharge from the vagina. The mare is often swollen somewhat on the near flank, feverish, and sometimes slightly foundered. The udder is often milky but hard.

Coorabie Agricultural Bureau ask a suitable lick for stock.

Reply-A suitable lick for the Coorabie country would be one part saltpetre, five parts bone meal; a few lumps of rusty iron too big to be swallowed lying on the top of it would add to its efficiency. The lick may be put out in covered troughs.

Coorabie Agricultural Bureau ask treatment for worms in pigs.

Reply—The worms answer to the description of the ordinary ascarid of the pig, which may be got rid of by giving two or three ounces of crushed castor oil seeds occasionally in feed and regularly feeding cinders or ashes.

"W.J.R.," Millbrook, had a mare, four years old, kicked last March on front leg, a little above the chest level. The cut healed well, but still discharges a little.

Reply—Try dressing the weeping hole by soaking a bit of tow in spirit of iodine and twisting it in every day; if after a fortnight this has not succeeded in stopping the discharge, try dusting the hole daily with chlorinated lime, commonly known as chloride of lime. There is probably a bit of diseased tissue at the bottom.

"W.S.," Middleton, has a cow swollen about mouth and brisket, appetite irregular.

Reply—The symptoms are too indefinite to allow a correct diagnosis to be made, but it is probable that the swellings are dropsical, and arise from the heart-bag being penetrated by some substance, such as a bit of wire or a bag needle that has been swallowed. Treatment is not likely to do much, but 10 drops of tr. nux vomica may be given each evening and 10 drops of tr. digitalis each morning. The treatment may be continued for three or four weeks.

"G.E.," Mildura, asks questions as follows:—(a) Cause of dung passing through vagina of mare; (b) injection of cocaine for a

horse; (c) treatment for horse lame at the trot; (d) treatment for a cow off feed fortnight after calving.

Reply—(a) Probably nothing can be done, as there is an accidental fistula; keep clean and leave to nature. (b) It is not advisable to inject cocaine deeply into tissues, as abscesses often ensue. (c) The symptoms point to deep-seated injury in the foot; try poultice and search well for embedded stub or similar substance. (d) Possibly absorbed septic material; try 20zs. of hyposulphite of soda in a pint of warm water twice daily for four days.

"H.R.M.," Ashbourne, seeks treatment for warts on cows' teats. Reply—If small, rub in easter oil one day and vinegar the next till they disappear. If large, tie root with silk or horsehair; or better, sear off with tableknife blade red hot and dress with boracic ointment.

"R.S.T.," Rockleigh, asks treatment for horse affected with lice. Reply—Wash or spray with soft soap suds and leave to dry on, then wash off with soda and water. Give a flat tablespoon of sulphur in food daily for a week. See many recent replies for fuller detail.

"T. McD. & Son," Moorook, report a mare affected with traumatic ulceration of eye and loss of same. They ask treatment.

Reply—Dab daily with a lotion composed of tr. calendula one part, methylated spirit two parts, water 10 parts. Dust afterwards with boracic powder; treat the lower ulcers the same. Healing should occur in about a fortnight.

"F.V.L.," Kenton Valley, has a mare which had twin foals—one dead and decomposed. Six weeks before foaling she had colic, with rumbling, and again just before foaling. He asks a number of questions.

Reply—Twins of this character are the result of fertilisation of two ova at different heats, hence the difference in development. (1) The trouble began when the first pain was noticed and not later. It is quite feasible for a mare to carry such a foal dead for six weeks and even much longer. As the composition of the drench is not known to the writer no opinion can be offered on it. The milk came for the early foal, then again for the other. (2) It is quite possible for a mare to discharge one foal and retain a second to maturity—in fact, it often happens. (3) It is not possible for an amateur to know if two foals are present. (4) The mare would probably be better not put to the horse this season; still, if very much desired she may be served.

Elbow Hill Agricultural Bureau report horses being troubled with swollen noses.

Reply—Little notice need be taken of the condition, which is lymphatic; a teaspoonful of saltpetre in a mouthful of bran once or twice a day will reduce the swelling. They may be worked.

"R.P.S.," Rudall, has a horse which bruised its shoulder at gallop two months ago. There is now a hard lump at the point of the shoulder, but this gives no pain.

Reply—It will probably be best to leave it alone, but no would result from rubbing in a little blue mercurial ointment of a day for a week every month for three or four months.

"Y.P.," Saddleworth, has a cow within six weeks of calving; it has developed a big swelling in flank as result of abscess forming after being stabbed for hoven in May.

Reply—The swelling is probably full of matter, and it would be well to take up a fold of skin at the bottom of it and lance it, making a hole about an inch long. If the skin is pinched she will not notice the prick, and it will not interfere with the calving. Hot fomentations after if necessary, but probably a little Stockholm tar will be all that need be put on.

"H.B.," Port Pirie, asks treatment for a mare troubled with lice.

Reply—Give a flat tablespoon of sulphur in feed once a day for a week. Washing with sheep dip (non-poisonous) is all right, but will be more effectual if the mare is stood in the sun for half an harrow or so and well lathered with soapsuds, which is left on to dry, then washed off. Full instructions have appeared in reducent Journals. She should be dressed every three weeks for a time as the lice continue to hatch out. An occasional rub over with benzine on the part and olive oil five parts is useful.

"J.T.C.," Merghiny, states that a heifer staggers, stands stretched out, and heaves.

Reply—It is impossible to say what is the matter, but as she may have had an injury from the others it is probable there is an internal strain. It may be something entirely different, such as quarter evil. The best line of treatment is to leave well alone.

"A.H.T.," Cleve (a) reports that a mare did not clean well, and drips discharge, and (b) asks the best antiseptic to use in connection with the castration of colts.

Reply—(a) Probably this is the same case as one prescribed for already, but she will benefit by being swabbed out with a pink solution of Condy's crystals, as much as will lie on a sixpence to a kerosine can of warm water, or a handful of washing soda to the same

amount of water; ten drops tr. pulsatilla on the tongue morning and evening for a week or ten days. (b) As good an antiseptic as any is a handful of washing soda in a bucket of water. Soap is good. Spirit of iodine is well spoken of, so is carbolic oil, or the old-fashioned verdigris ointment.

"B.H.B.," Kangaroo Island, has a five-year-old cow, swollen about the legs, and at times affected with heavy breathing.

Reply—It is difficult to be sure of a diagnosis, but it is possible there is a piece of wire or similar substance in the heart bag. The following treatment might be tried, but if no improvement in a fortnight, it need not be continued:—Daily in feed a tablespoonful of sulphur and a teaspoon of sulphate of iron.

"S.H.C.," Wanbi, reports that the eye of a horse was knocked out, replaced, but is now going rotten.

Reply—Wash with 5 per cent. solution of cocaine, then with warm water with Condy's crystals, as much as will lie on a threepenny bit to a quart of water. Next tie a clove hitch of silk round the back of the eyeball and cut it off; leave the silk on for a day or two, dusting the socket with boracic acid each day. Remove silk, and repeat boracic acid as often as seems necessary, about twice a week.

"J.B.," Stone Hut, has a mare affected with intermittent colic for some months.

Reply—There is probably some internal tumor or accretion, which may end fatally one day. When the pain is on veterinary chlorodyne electuary would be best, and in between 10 drops of tr. nux vomica on the tongue morning and evening for a week, then once a day for three weeks. Water before feeding, and do not keep changing feed; she would probably do best on chaff and bran, rather than green feed.

"W.G.B.," Farrell's Flat, had a small growth removed from the penis of a stallion some months ago. He asks if there is a likelihood of it returning, and for a wash for the organ.

Reply—Is not very likely to return, but if it did it should be dressed with lunar caustic stick. A good antiseptic wash for the organ is an ounce of boracic acid to a gallon of water.

"J.G.P.," Bookpurnong, reports two cases—(a) Mare, affected with strangles, with pus coming from nostrils, died in a few days; (b) five-year-old stallion, fed on green feed, is lazy at service.

Reply—(a) In a similar case, put Stockholm tar on a rag wrapped round a bit and left in the mouth for some hours. Give twice a day for three days an ounce of photographer's hypo. (hypo-sulphate of soda) in the drinking water. If case is very severe, a teaspoonful

of sulphate of quinine in a spoonful of molasses on the teeth twice a day as well. (b) Drugs do harm, not good. Try hard feed, with plenty of oats and barley, and if that does not prove successful he is not much good as an entire.

"H.B.," Crystal Brook, asks treatment for a cow with a blind teat. Reply—As a rule it is better not to interfere with a blind teat, but if desired such a teat can be opened with an instrument called a teat dilator, or another called a bistouree cache. The better treatment is to leave it alone.

"S.H.P.," Cleve, asks for treatment for vermin on pigs.

Reply—Though these look like ticks, they are lice, the largest of their breed. See *Agricultural Journal* for treatment in many replies. Spray with an emulsion of soft soap and liquid sheep dip, or serub with the same mixture made of 4galls. soft water, ½lb. soft soap, and 4oz. sheep dip. Clean houses with boiling water, burn all bedding, &c.

"W.E.S.," Farrell's Flat, has a horse with a swelling with warty growth on it underneath the sheath.

Reply—If the horse is grey it is useless to treat, but if of another color the horse should be cast and the growth cut out. There may be a good deal of bleeding; if so, stop with hot iron; if not, use lunar caustic. The sheath is likely to swell a good deal after the operation.

Netherton Agricultural Bureau asks (a) whether damping hay chaff to mix with pollard or crushed grain is injurious to horses; (b) cause of horses' heads and jaws swelling when on short green feed.

Reply—(a) Damping was at one time highly recommended, but from a physiological point of view it is better to give food dry and let the horse damp it by chewing; the same argument applies to crushing grain. As damping is often resorted to to keep down dust and other injurious matter in inferior feed, it often is followed by colic. (b) The swelling round the throat is lymphatic, due to the active working of the jaws; it is of no importance, and requires no treatment except exercise.

"C.W.," Whitwarta, has a horse which was wounded in the chest in March last; the wound is suppurated, and still discharges.

Reply—There is still something at the end of the wound, and it will not heal till that is removed. Probe with wire, and possibly the wound will be found to extend behind the shoulder. Open where most convenient, remove irritant, dress daily with spirit of iodine. The wound should heal after such treatment in about a month.

"A.L.," Keith, reports an eight-year-old mare as tucked up, falling away; passes bloody water after slipping foal.

Reply—There is probably trouble in the womb. Give her once daily for a fortnight, morning 20 drops tr. pulsatilla, evening 20 drops tr. arnica. They can be put on the tongue neat or mixed in a spoonful of molasses.

"A.H.," Kulde, has a yearling filly, the eye of which was injured by wire; there is now a jelly-like blob at the bottom of the eye.

Reply—Probably the eye will get all right without treatment. If, however, it does not in a month or so, the jelly, if still there, should be touched with a caustic pencil.

"T.E.H.," Butler, has cows in good condition, but giving little milk. A bull is running with them.

Reply—As bull runs with them, they naturally get in calf, and shrink in milk permanently. Try hot bran mashes during milking each evening, and if lucerne can be got give them that. Get a little book on cow management. A cow wants a pound of corn for every gallon of milk, and two gallons of water for the same quantity; probably she is short of both these.

"M.J.McA.," Georgetown, reports three-year-old colt as being weak in the back.

Reply—Give 10 drops tr. nux vomica en tongue or in a handful of bran twice a day for a fortnight.

The same correspondent also reports the occurrence of a fairly hard lump between the eye and nose of a filly.

Reply—Probably a bone disease connected with teething. Rub in a little blue mercurial ointment every day for two or three weeks, and give once a day on the tongue two tablespoons of syrup of phosphate of iron.

"D.J.D.," Long Plain, has a mare with a cut tendon and swelling above the knee. Treatment previously advised followed with very good results.

Reply—Glad to hear treatment has been satisfactory; probably now exercise as suggested would be good. If the swelling is on the course of the tendon in front of the knee, rub in a little blue mercurial ointment every day for a few weeks; if it is at the side on the bone, blister with any good blister, such as biniodide of mercury one dram, lard one ounce.

"A.A.P.C.," Millicent, reports that blood cozed from the legs and feet of a horse after work; the animal requires assistance to enable it to rise.

Reply—Probably not founder, but purpura hæmorrhagica. Keep on green feed, and three times daily give a ball composed of one dram each carbonate of iron, saltpetre, and Venice turpentine. Dust the bleeding parts with boracic acid. A severe case wants veterinary aid and injections of adrenalin.

"H.L.," Wokurna, asks for means of easing a cow that is hard to milk. The teats are fairly large, but openings small.

Reply—Procure a teat dilator from an instrument dealer and use it as directed on the wrapper. Failing this, pass a well-greased quill into the teat about ¼in. occasionally; this, however, may set up irritation and spoil her—the dilator will not do so.

"F.S.B.," Penong, reports that a seven-year-old mare lost condition, and is stiff in near foreleg.

Reply—Seem to point to some form of heart trouble, as the stiffness was accentuated after dosing with aconite. Probably the best treatment would be to turn out in good feed for a few weeks.

"S.H.E.," Jamestown, has a gelding troubled with swelled penis and dribbling of urine.

Reply—A three week course of Fowler's solution will do good as a needed tonic. In addition, twice a day give 20 drops tincture camphor. It would be well to examine the bladder through the hind gut to determine whether there is a collection of sandlike material in it.

"E.L.," Steelton, had a horse on green feed, dandelions and clover, and receiving hay and chaff daily. On being put to work the mare was attacked with colic and death ensued. He asks (1) cause and treatment; (2) in view of presence of worms, should he treat other horses for these; (3) is it advisable to give them less access to green feed; (4) particulars re mixing feed; and (5) suitability of Berg oil for colic.

Reply—Inflammation frequently happens when feeding is mixed, as in this case, also lush dandelions produce a special poison—prussic acid—which accounted for the quick death and panting. Possibly tincture aconite and peppermint might have helped, but it is doubtful. Various hypodermic injections would have been resorted to by a veterinary surgeon had one been available. 2. A course of Fowler's solution will do good. 3. The free access to green feed was to blame. 4. One-third green to two-thirds hay chaff is used on many farms with advantage, but as its careless use might produce colic, the writer would sooner give long hay at night and green feed during the day. 5. The constituents of Berg oil are very suitable in

cases of colic, but the Stockholm tar without the creosote would be cheaper and more effectual.

"H.H.W.," Pinnaroo, asks for treatment of horses affected with lice.

Reply—Stand the animals in the sun for an hour, wash them with lather of softsoap, leave this to dry on. A few hours later wash it off with warm water and soda, with a wineglassful of coal tar disinfectant to the bucketful. All this washing can be done with a yard-broom. Wipe over the worst parts with a mixture of benzine one part, cheap machinery oil five parts; use this mixture every day for a week, then repeat wash, and, if necessary, in third week also. A tablespoon of sulphur in feed once a day will also help to get rid of pests.

"A.J.A.K.," Lameroo, reports that some sheep brought on to lucerne lie down, do not struggle, are not bloated, bodies become limp, and a small quantity of green fluid is discharged from nostrils; last year on the same plot the animals were all right; three post mortems revealed the paunch full of brown liquid like brown milk; hinder gut almost empty except for undigested green material.

Reply—A microscopical examination will be made, but the symptoms point to an invasion of minute animal parasites called sarcosporidæ, and the change of diet is not responsible; in fact, it is advisable to change pasture every three days at least and not bite down tight. A few doses of Cooper's worm tablets would do good, combined with salt, which last may be given in a little cocky chaff. After examination of faces a further report will be sent.

Veterinary enquiries were also received, and replied to direct, from the following:—"F.S.," Elliston; "C.A.H.," Buccleuch; "B. Bros.," Carrow; "J.F.," Leighton; "H.W.D.," Riverton; "A.J.H.," Spalding; Lameroo Agricultural Bureau; "S.L.," Angas Plains.

"T.D.K.," Streaky Bay; "J.P.S.," Tarcowie; "F.M.H.," Wellington; who report a disinclination on the part of stallions to work, are referred to page 127 of the current issue.

Inquiries relating to blood worms, and disorders originating therefrom, particulars of which have frequently been published in the *Journal* of late, have been received from the following, replies having gone forward direct:—"C.H.," Foster; "F.J.B.S.," Morchard; "H.C.W.," Kangaroo Island; "G.C.P.," Mount Lofty; "A.L.," Naracoorte; "M.F.C.," Keith; "F.L.V.," Brentford; "M.B.," Lucindale; "F.N.C.," Wirrega; Beaufort Agricultural Bureau; "M.R.B.," Mindarie; "R.F.," Rendelsham; "C.W.," Whitwarta.

AGRICULTURAL INQUIRIES.

In reply to "J.S.," Hartley, the Director of Agriculture says:—There is advantage in feeding off wheat crops with sheep when the condition of the crops is such as to render it advisable, i.e., when the crops are too rank and forward and liable to be lodged by rough spring weather. If, however, the crops are fed off too late in the season, say after the first week in July for the Lower North, yields are likely to be unsatisfactory, unless the spring and early summer are exceptionally favorable.

Salt Creek Agricultural Bureau asks for information relating to pickling meat, to which the Dairy Expert replies:—If dry cured, use approximately 12lbs. of salt to 2lbs. of sugar and 2½ozs. of saltpetre, mixed, per 100lbs. of beef. If brine pickled, 8lbs. of salt, 2lbs. of sugar, 2ozs. saltpetre, added to 4galls. or 40lbs. of water. Beef and mutton cured for ordinary use should be pickled for six or seven days and pork nine days. If brine pump is used it would be done in half time by pumping the following mixture into the meat to be pickled:—2½lbs. salt, 1oz. of saltpetre, 1oz. standard preservative, 1gall. water.

In reply to "M.L.," Hornsdale, the Dairy Expert says:—Butter-fat percentage means the actual number of pounds of pure fat of butter in 100lbs. of cream. Table or commercial butter means the actual fat or butter fat which during the process of churning has incorporated with it approximately 14lbs. to 16lbs. of water per 100lbs. and salt and preservatives used to suit the market. The farmer should, when paid for butter-fat contents of his cream, receive 1\frac{3}{4}d. to 2d. more per lb. than when paid on table or commercial butter contained.

Yadnarie Agricultural Bureau asks whether wheat pickled with bluestone, and fed to fowls, is likely to poison them. The Poultry Expert says:—Wheat pickled with bluestone does not contain sufficient copper to poison the birds. On the contrary, it has always been noted that on farms where surplus pickled wheat is used for poultry food there is freedom from roup and other throat troubles. Copper sulphate (bluestone) ranks as one of the most potent bactericides—1.e., it kills the germs causing many diseases. It is also administered internally in suitable doses.

ENTOMOLOGY.

"J.J.B.," Georgetown, forwarded specimens for identification. Mr. A. M. Lea, Museum Entomologist, reports that the specimens are cockchafer larvæ, but there are so many hundreds of species in South Australia, and their larvæ are so much alike, that he cannot identify the particular species. Such larvæ are proverbially difficult to eradicate, and they occasionally do immense damage to crops. The sugarcane beetle of Queensland is one of the family, and investigations for several years have discovered no satisfactory remedy for it; nor are remedies known in other parts of the world. Bare fallowing is sometimes recommended but is of doubtful utility.

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of August, 1915, 7,050bush. of fresh fruits, 7,460bush. of bananas, 16,899 bags of potatoes, 691 bags of onions, and 93 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910. One hundred and forty-four bushels of bananas (overripe) were destroyed. Under the Federal Commerce Act 658 cases of fresh fruits, 800 packages of dried fruits, and 11 packages of preserved fruit were exported to oversea markets during the same period. These were distributed as follows:-For London, 6 cases citrus fruit and 800 packages dried fruit; for India, 10 packages preserved fruit; for New Zealand, 652 cases citrus fruit and 1 package jam. Under the Federal Quarantine Act 53,783 packages of seeds, plants, bulbs, etc., were examined and admitted from oversea markets. Of these 1 package of grass was detained for the purpose of cleaning out weed seeds, and 5 packages of millet were ordered to be destroyed owing to the presence of a large number of weed seeds.

THE EQUIVALENCE OF LIVESTOCK FOODSTUFFS AND FEEDING RATIONS.

By ARTHUR J. PERKINS, Director of Agriculture.

Introductory.

I had originally intended dealing with the equivalence of Livestock Foodstuffs before the 1915 Congress of the Agricultural Bureau; and had, indeed, already accumulated much material towards this end, when unforseen circumstances compelled us to abandon Congress for the year. And whilst the choice of this subject was perhaps chiefly dictated by the extraordinary circumstances of the season from which we are only just emerging, considerations of a more general and more permanent nature had also much to do with the matter. We all know that in 1914-15 the scarcity of livestock foodstuffs was so appalling and so unexpected that many an owner of livestock, who in past years had been content to make indiscriminate use of whatever came nearest to hand, was hard put to it to find material of any kind calculated to keep his animals alive. On the other hand, however devoutly we may hope and believe that never again the present generation of livestock owners will find themselves in similar straits, yet instances of individual difficulties of like nature are bound to arise from time to time, when some acquaintance with the equivalence of the various livestock foodstuffs is certain to prove nseful.

But, from another point of view altogether, and quite independently of the peculiarities of seasons, may it not be said that in the matter of feeding, local ideas are as yet very elementary? Under normal conditions natural foodstuffs spring up around us very plentifully; and whilst they continue available we make use of them in no ungrudging spirit. Eventually, however, early or late in the season, they come to an end, and subsequently, for a few weeks at all events, we are puzzled to know what to do with our livestock. And whilst we are still endeavouring to make up our minds as to the best course to pursue the new season's supplies usually forestall any definite resolution on the subject; and although in this short interval of scarcity we may have lost a few head of livestock, we thankfully put off for yet another season any further consideration of a trouble-some problem. And thus the unsolved question drags on from year

to year, and we continue as far off as ever from any rational policy in the general feeding of livestock.

Much has been done within recent years in other countries towards the elucidation of feeding problems, and it appears to me that a brief summary of the present position of knowledge on the subject should prove useful to us, not only in times of scarcity, but in matters of every-day practice.

THE GENERAL COMPOSITION OF FOODSTUFFS.

If, now, we wish to get a clear insight into the art of feeding, it is essential, in the first place, that we should form a very definite idea of the general composition of foodstuffs. In a general way, any of the foodstuffs in current use—hays, grains, cakes, etc.—admit of being split up into the several constituents indicated below in Table I.

Table I.—Showing usual Constituents indicated in Proximate Analysis of Foodstuffs.

I. Moisture (10 per cent.)

A. Ash or mineral matter (6·21 per cent.)

B. Organic matter (1. Proteins (5.12 per cent.))

2. Fats (0·77 per cent.)

3. Carbohydrates (53·51 per cent.)

4. Fibre (24·39 per cent.)

The figures in brackets in the above table refer to the analysis of good standard wheaten hay.

I.—Moisture.

Moisture refers to water, which is present in varying proportions in all foodstuffs, even in those driest in appearance. The actual proportion of moisture in foodstuffs varies, however, within a very wide range; according to circumstances it may vary from 5 per cent. to 90 per cent. of the total weight of the foodstuff.

Now, however important water may be to the animal organism, it is very evident that, after all, the intrinsic value of any foodstuff must always rest on the dry matter present, and is therefore inversely proportion to its tenor in water. In other words, we do not purchase a foodstuff for the water it contains, but for its dry matter; and it follows, therefore, that, other things being equal, a foodstuff rich in water should be lower in price per unit than one that is comparatively dry.

The determination of the moisture present in a usually "dry" foodstuff offers at times another point of interest. Generally speaking, the drier types of foodstuffs keep better than the moister ones, and a dry foodstuff presenting an abnormal proportion of moisture is always liable to deteriorate on keeping.

The average percentages of moisture usually found in typical classes of foodstuffs are indicated below in Table II.

Table II.—Showing Average Moisture Percentages in Typical Classes of Livestock Foodstuffs.

	Moisture.
	Per cent.
Refuse and oil cakes	5 to 9
Grains and seeds	10 to 14
Hays	10 to 15
Ensilage	
Grasses and green forage	70 to 80
Roots and tubers	80 to 90

II.—Dry Matter.

In any foodstuff what is known as the dry matter is represented by the solid substance from which all natural moisture has been driven off by the action of heat. And it is on this dry matter, as has already been stated, that rests the intrinsic feeding value of the foodstuffs.

The dry matter itself always admits of being separated out into two distinct parts, viz.:—a, the ash or mineral matter; b, the organic matter.

A.—Ash, or Mineral Matter.

The ash, or mineral matter, as its name indicates, represents in the foodstuff that portion of it which is incombustible; or, in other words, the whitish residue left when the foodstuff is carefully burnt. This mineral matter consists exclusively of those substances which the roots of plants, from which foodstuffs are usually derived, withdrew originally from the soil in aqueous solution.

In any general appraisement of the feeding value of a foodstuff it is not as a rule customary to take into consideration its purely mineral constituents; and this, because in the great majority of cases the mineral matter present in these foodstuffs is amply adequate to the normal calls of the animal organism. It should not, however, be imagined on this account that the mineral matter of foodstuffs is without practical importance, and as such more or less negligible. Independently of its more obvious role in the fashioning of the bony skeletous of animals, mineral matter enters, too, into the composition of flesh and blood, and cannot in any way be dispensed with. It has, indeed, been a matter of common experience all the world over that the unsatisfactory development of some locally reared animals can frequently be connected, through the herbage they consume, to a lack of lime and phosphates in the soil. Such, for instance, was said to be the case in the days of the pastoral occupation of some of the

districts to the south-east of the Murray. And it may reasonably be inferred that if natural herbage is at all deficient in minerals, so also will be hays and grain grown in the same soil. If, therefore, from the point of view of the owner of livestock, it is naturally the organic matter in the foodstuff that is of chief importance, he cannot, however, afford altogether to overlook the mineral matter, particularly when the foodstuffs have been grown on land notoriously deficient in lime or phosphates.

There is, too, another aspect of the question to which reference should perhaps be made—thus, at times foodstuffs may be excessively charged with mineral matter. This is the case with young grass of rank growth, with immature roots and tubers; indeed, with immature plant growth of any kind. This excess of minerals at times reacts unfavorably on livestock, as has frequently been shown to be the case with immature mangolds overladen with nitrates.

Quite recently I had occasion to comment in this direction on some Japanese millet hay, grown on reclaimed swamp land on the Murray. This hay was very heavily charged with saline matter, and appeared in consequence to be more or less distasteful to livestock.

The above cases are, however, no more than accidental occurrences. important in themselves it is true, but of rare occurrence in the matter of ordinary livestock foodstuffs.

In these foodstuffs the proportion of mineral matter present in the dry matter will vary with the state of maturity of the plants from which they were derived. Thus, hay cut on the green side will show proportionally more minerals than hay in a more advanced stage of development; and minerals reach their lowest proportion in ripe seeds and grains. Very naturally, too, foodstuffs containing a high proportion of moisture will show a correspondingly lower percentage of minerals than comparatively dry foodstuffs. In Table III. I have indicated the proportions of mineral matter found in the usual livestock foodstuffs, in terms both of the dry matter present and of the total foodstuff.

Table III.—Showing Average Proportions of Mineral Matter in usual Livestock Foodstuffs.

	Mineral Matter.			
	In Total		In Dry Matter	
	Foodstuff.			
	Per cent.		Per cent.	
			· · · · · · · · · · · · · · · · · · ·	
Roots			3.1 to 3.4	
Green forage and grass	1.0 to 2.5		4.2 to 9.1	
Grains and seeds	1.5 to 3.0		1.8 to 3.4	
Hays	5.0 to 8.0		6.3 to 9.8	
Refuse and oil cakes	5.0 to 10.0		5.8 to 11.8	

B.—Organic Matter.

Organic matter is the combustible substance in any foodstuff, and represents the great bulk of its dry matter. It is derived chiefly from the elements of water and the carbonic acid gas of the atmosphere. From the feeder's point of view the economic value of any foodstuff is dependent chiefly on the character of its organic matter.

This organic matter of foodstuffs is more or less complex in composition; for general purposes, however, it admits of being split up into four different classes of constituents:—1, crude protein; 2, crude fat; 3, carbohydrates; 4, fibre.

From the chemist's point of view the above division is very far from satisfactory, and has often been criticised. It still remains, however, the best division that we can offer for practical purposes, and there is nothing to be gained in emphasizing its particular weaknesses.

We shall now proceed to consider each individual constituent in detail.

1.—Crude Protein.

The qualifying term "crude" is used in connection with this class of bodies, because as a rule it is made to include all organic nitrogenous substances of foodstuffs, a small proportion of which are not true proteins. Crude protein therefore represents the organic nitrogenous matter in foodstuffs, and as such may be considered as essentially the flesh-forming material of the foodstuffs. That such is the case will be realised when it is stated that "lean meat" is in its composition practically identical with protein. We depend therefore on this protein of our foodstuffs both for the building up of the flesh of our livestock and for making good the constant waste of body proteins, which is one of the natural consequences of active existence. It will be clear, too, that young growing animals, whose organs and flesh are gradually developing, will need both relatively and absolutely more protein than full grown animals, and consequently more highly nitrogenous food, of which milk may be taken to be an extreme example. With full grown animals, on the other hand, actual increase in flesh is confined within very narrow limits, and beyond these they may be said in ordinary circumstances to need no more protein than is absolutely necessary to make good normal body wastes. The production of milk, however, represents a heavy drain on body protein, and in the circumstances dairy cattle, as distinct from ordinary fattening animals, call as a rule for rather highly nitrogenous rations, particularly when individual production of milk is heavy.

The value of food protein, however, does not end with the production of flesh. When in any foodstuff there is a surplus of protein over and above flesh forming requirements, it is immediately availed of in the body for the production of heat or work, or the formation of body fat.

The range of variation of crude protein in the usual classes of foodstuffs is shown below in Table IV.

Table IV.—Showing Average Proportions of Crude Protein in usual Livestock Foodstuffs.

	Crude Prot	tem.
	Per ce	
Roots		
Green forage and grass		
Hays Grains and seeds	5.7 to	16.0
Refuse and oil cakes	. 16.0 to	50.0

2.—Crude Fat.

Here, again, the qualifying term "crude" is essential, since with true fats are included small proportions of other substances equally soluble in ether. As a rule, however, the percentage of impurities present is too small to have any bearing on general results.

The fats of foodstuffs are essentially energy and heat producing constituents; they may be said to represent much of the fuel that maintains life. Additionally, they serve, too, towards building up body fat. For these special purposes—the development of heat and energy and the formation of body fat—the fats of foodstuffs, as we shall have occasion to see later on, must be looked upon as the most concentrated of foodstuff constituents, and as having, weight for weight, a higher feeding value than any other constituent.

The percentages of fat in foodstuffs vary within fairly wide limits; they are indicated below in Table V. for the chief types of foodstuffs:—

Table V.—Showing Average Percentages of Crude Fat in the Chief Types of Livestock Foodstuffs.

	Crude Fat.
	Per cent.
Roots	0·1 to 0·3
Green forage and grass	0.3 to 1.0
Hays	0.8 to 3.5
Grains and seeds	1.5 to 6.0
Refuse and oil cakes	6.0 to 15.0

3.—Fibre.

In any foodstuff what is known as "fibre" includes as a rule the least digestible portion of the foodstuff. Fibre consists very largely of the cell envelopes of plants, which proportionately to the state of

ripeness of the plant are more or less hard and woody. In principle, therefore, a high percentage of fibre must be taken to be characteristic of foodstuffs of relatively low feeding value. The feeding value and functions of that portion of the fibre which can be utilised by animals are similar in nature to those of the carbohydrates, which we shall examine in next section.

The average percentages of fibre found in the usual types of foodstuffs are indicated below in Table VI.

Table VI.—Showing Average Percentages of Fibre in Chief Types of Livestock Foodstuffs.

	Fibre.
	Per cent.
Roots	0.9 to 1.7
Grains and seeds	3.0 to 10.0
Green forage and grasses	
Refuse and oil cakes	8.0 to 20.0
Hays	22·0 to 35·0

4.—Carbohydrates.

Finally, in the organic matter of a foodstuff, what is neither protein, fat, nor fibre, is termed "carbohydrates." This term, therefore, represents the residues of the analysis, and includes chiefly such substances as starch, sugars, etc., besides other minor impurities. All these substances are essentially heat, energy, and fat producing, although for these purposes of lower intrinsic value than the fats of foodstuffs.

The average percentages of carbohydrates found in the usual types of livestock foodstuffs are indicated below in Table VII.

Table VII.—Showing the Average Percentages of Carbohydrates in the Usual Types of Livestock Foodstuffs.

	Cartohydrates.
	Per cent.
Green forage and grasses	3.5 to 12.0
Roots	
Refuse and oil cakes	20.0 to 35.0
Hays	27.0 to 44.5
Grains and seeds	45.0 to 70.0

GENERAL COMPOSITION OF FOODSTUFFS.

We have now considered more or less in detail the several constituents which go to make up any livestock foodstuff. I indicate below, in tabular form, collated from several sources, the general composition of the chief foodstuffs that are in normal conditions usually available to us.

Table VIII.—Showing General Composition of Livestock Foodstuffs usually obtainable in South Australia.

3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Main	70	3.52 1		~ .		~ .
	Mois- ture.	Dry	Mineral	Crude	Crude	1721	Carbo-
Roots-	%	0/	%	Protein.	Fat.	ribre.	hydrate.
Carrots	85.0	$^{\%}_{15\cdot0}$	0.9	% 1·4	$\overset{\%}{0\cdot 2}$	$\frac{\%}{1.7}$	% 10·8
Mangolds	88.0	12.0	0.8	1.1	0.1	0.9	9.1
Potatoes	75.0	25.0	0.9	$2 \cdot \hat{1}$	0.3	1.1	20.6
Swedes	89.4	10.6	0.6	$\overline{1}\cdot\widehat{4}$	0.2	1.3	7.1
Turnips	92.0	8.0	0.7	1.1	0.1	0.8	5.3
Green Forage, &c.— Field cabbage	84.7	15.3	1.6	2.5	0.7	2.4	8.1
Red clover	79.0	21.0	1.6	3.4	0.7	5.9	9-4
Crimson clover	81.5	18.5	1.9	2.8	0.7	6.2	7.0
Italian rye	73.4	26.6	2.8	3.6	1.0	$7.\overline{1}$	12.1
Perennial rye	70.0	30.0	2.0	3.6	1.0	10.6	12.8
Lucerne (before flowering)	76.0	24.0	$2 \cdot 3$	4.5	0.8	6.8	9.6
Lucerne (full bloom)	76.0	24.0	$2 \cdot 2$	3.9	0.8	7.8	9.3
Maize	81.9	18.1	1.2	1.4	0.5	$5 \cdot 1$	9.9
Mustard	82.7	17.3	1.4	$2 \cdot 1$	0.5	5.8	7.5
Oats (carly growth)	83.9	16.1	1.5	2.3	0.5	3.8	8.0
Oats (in bloom)	76.8	23.2	1·8 1·6	1.9	0.6	8.5	10·4 8·8
Barley (early growth) Barley (after bloom)	81·0 68·6	$19.0 \\ 31.4$	2.0	2.5 2.2	0∙5 0∙5	5·6 9·9	16.8
Pease (in bloom)	84.6	15.4	1.4	4.0	0.5	4.5	5.1
Field beans (in bloom)	85.0	15.0	$\hat{2} \cdot \hat{0}$	3.2	0.8	3.3	5.7
Rape	87.0	13.0	1.6	2.9	0.6	4.2	3.7
Rye	76.6	$23 \cdot 4$	1.7	3.0	0.9	7.5	10.3
Sorghum	86.1	19.9	1.4	$2 \cdot 1$	0.6	$6 \cdot 2$	9.6
Sainfoin	80.0	20.0	1.2	3.5	0.6	6.9	7.8
Vetches	82.5	17.5	1.5	3.2	0.5	$5 \cdot 1$	$7 \cdot 2$
Hays—							
Wheaten hay (full bloom)	10.3	89.7	6.4	6.6	0.7	27.5	48.5
Wheaten hay (standard)	10.0	90.0	$6 \cdot 2$	5.1	0.8	$24 \cdot 4$	53.5
Wheaten hay (overripe)	8.4	91.6	5.7	5.5	1.3	24.3	54.8
Red clover hay	16.5	83.5	6.0	13.5	2.9	24.0	37.1
Oaten hay (in bloom)	11.5	88.5	6.1	7.5	2.4	30.1	42.4
Lucerne hay (before bloom)	16.0	84.0	7.3	16.2	2.4	27.0	31.1
Lucerne hay (in bloom)	16.5	83·5 83·3	$8.0 \\ 8.3$	$14.2 \\ 14.2$	$2 \cdot 6$ $2 \cdot 5$	$29.5 \\ 25.5$	$\frac{29 \cdot 2}{32 \cdot 8}$
Pease (in bloom)	16.7 14.3	85·7	7·8	11.2	3.2	22.9	40.6
Italian rye grass	14.0	00.1	1.0	11.2	0 2	ט שע	1 0 0
Grains—							
Wheat	13.4	86.6	1.7	$12 \cdot 1$	1.9	1.9	
Rye	13.4	86.6	2.0	11.5	1.7	1.9	69.5
Maize	13.0	87.0	1.3	9.9	4.4	2.2	69.2
Oats	13.3	86.7	3∙1 2∙6	$10.3 \\ 12.0$	$\frac{4.8}{2.4}$	10·3 5·0	$\substack{58\cdot2\\63\cdot7}$
Barley (malting)	14·3 13·6	$85.7 \\ 86.4$	4.6	5.4	0.6	19.3	56.5
Barley (Cape)	14.3	85.7	3.2	25.4	1.5	7.1	48.5
Pease	14.0	86.0	2.8	22.5	1.6	5.4	53.7
Carob beans	15.0	85.0	2.5	5.8	1.3	6.4	69.0
•				•			
Milling By-products—		0= 0	0.0	10.4	0.0	0.4	F0.0
Bran	12.2	87·8	3.6	16.4	2·6 3·2	$8.4 \\ 4.3$	56·8 64·5
Pollard	10.4	89.6	$2 \cdot 3$	15.3	3.7	4.9	04.0
Straws and Haulms-				•			
Barley straw	14.3	85.7	5-5	3.3	1.4	40.8	34.7
Oaten straw	14.3	85.7	5.7	3.8	1.6	38.7	35.9
Wheaten straw	14.3	85.7	4.8	3.0	1.2	40.8	35.9
Maize straw	15.0	85.0	4.8	5.0	1.5	39.2	34.5
Rye straw	14.3	85.7	4.1	3.1	1·3 1·6	$\frac{44.0}{35.5}$	$33.2 \\ 33.7$
Pea haulms	13.6	86.4	6.6	9.0	1.0	99.9	99.1

Table VIII.—Showing General Composition of Livestock Foodstuffs usualyl obtainable in South Australia—continued.

	Mois-			Crude			
	ture.	Matter.	Matter.	Protein.	Fat.	Fibre.	hydrate
	07	9/0	%	%	%	. %	0/
Refuse and Oil Cakes—	, 5	, ,	, ,	, ,			,
Sunlight oil cake	10.3	89.7	5.6	20.7	11.2	11.6	40.6
Copra cake	11.3	88.7	5.5	18.8	12.6	9.9	41.9
Undecorticated cotton cake	10.5	89.5	$7 \cdot 2$	24.5	6.5	25.0	$26 \cdot 3$
Decorticated cotton cake	8.0	92.0	6.8	48.0	9.1	6.5	21.6
Linseed cake	11.0	89.0	6.5	33.5	8.6	8.7	31.7
Olive cake	11.7	88.3	5.5	$7 \cdot 2$	13.8	33.7	28-1
Palm nut cake	9.7	80.3	4.0	17.7	8.6	23.8	$36 \cdot 2$

VARIATION IN COMPOSITION OF FOODSTUFFS.

The figures given in Table VIII. for the composition of various foodstuffs represent averages which are liable to vary according to circumstances; and although in the main they are derived from Kellner, and therefore from analyses carried out in foreign countries, they are on the whole sufficiently accurate and reliable for ordinary purposes. In this connection, I shall give one instance of the variations usually met with in current practice. I have indicated below in Table IX. the analyses of several types of bran. Both the Japanese and Shanghai brans were introduced on the local market during the late drought, and I had them analysed in an endeavour to overcome a local prejudice against them.

Table IX.—Showing Variations in the Composition of Barn.

	English	Bran	South Australian	Imported Japanese	Imported
	Bran	(Kellner).		1	Shanghai
	(McConnell).	0.1	Bran.	Bran.	Bran.
•	%	%	0.7		97
Moisture	. 13.6	13.2	$12 \cdot 2$	$12 \cdot 1$	12.0
Ash	. 5.6	5.9	3-6	5.3	4.7
Protein	. 13.6	14.3	16.4	14.8	12.9
Fat	$3\cdot 4$	$4\cdot 2$	$2 \cdot 6$	3.4	3.1
Fibre	. 8.9	10.2	8.4	8-9	$7 \cdot 2$
Carbohydrates	54.9	$52 \cdot 2$	56.8	55·5	60.1
Starch equivalent .	. 43.5	42.6	$45 \cdot 2$	44.5	45.3
Albumenoid ratio .	1:4.3	1:4.1	1:3.6	1:4.0	1:4.8

The variations shown in this table are comparatively slight. I have made use of the term "starch equivalent," with which I propose dealing more in detail later on. It will be sufficient here to state that "starch equivalent" gives a single figure, rendering possible the comparison of several foodstuffs on the lines of relative feeding values. In the above table the most valuable brans are seen to be Shanghai and South Australian brans.

Finally, it should be pointed out that all these analyses have reference to samples of good standard quality; faulty or adulterated goods will naturally vary considerably from the figures indicated in the table.

DIGESTIBILITY OF FOODSTIIFFS.

We are not, however, in a position to deal with the equivalence of foodstuffs, or to contrast their relative feeding values, until we have realised the question of their relative digestibilities. When an animal consumes any given foodstuff, portion of it is absorbed into his system, where it is converted into heat, energy, or new tissue, whilst the balance is voided in the form of solid excreta; the latter, therefore, represent the undigested portion of the foodstuff. If, therefore, for a definite period of time, we weigh carefully all food supplied to one or more animals, and over the same period carefully collect all their solid excreta; if, further, we make a careful analysis both of foodstuffs consumed and of solid excreta voided, we shall be in a position to determine what portion of the foodstuff supplied proved digestible.

Let us take an example to illustrate the position. Four horses were fed for six days on wheaten hay chaff. They averaged individually 36.44lbs. of chaff per diem, and voided daily 73.29lbs. of solid exercta. On analysing both hay, chaff, and exercta we obtain the results shown in Table X.

Table X.—Showing Digestibility of Wheaten Hay Chaff.

	Dry			Carbo-
	Matter.	Protein.	Fibre.	hydrates
				and Fat.
	Lbs.	Lbs.	Lbs.	Lbs.
In hay consumed	32.95	1.87	8.93	19.87
In excreta voided	15.87	0.86	6.03	7.37
Difference digested	17.08	1.01	2.90	12.50
Percentage digestible or co-efficient of		Per cent.	Per cent.	Per cent.
Digestibility		53.87	32.42	62.91

From results set out in Table X. we may note the following points:—

- (1) Horses consuming daily 32.95lbs. of the dry matter in wheaten hay chaff digested 17.08lbs., or 51.82 per cent. of the dry matter. This percentage figure is known as the co-efficient of digestibility of the dry matter.
- (2) Similarly the same horses digested 53.87 per cent. and 62.91 per cent. respectively of the protein, on the one hand, and of the carbohydrates and fat on the other, present in the wheaten hay chaff.
- (3) Further, the same horses digested only 32.43 per cent. of the fibre present in the hay chaff. Hence we are able to realise that "fibre" is by far the least digestible constituent of hay, and, indeed, of any kind of foodstuff. It may be added here that this indigestibility of the fibre increases with the relative ripeness of the plants

from which it has been derived. The following figures taken from digestibility tests made at Roseworthy will serve to illustrate the position:—

				Per cent.
Digestibility	of fibre in	wheaten hay	at full bloom	46.99
., ,	**		one week later	
٠.	44	66	two weeks later	33.54
44	44	**	three weeks later	$32 \cdot 42$
66	**	66	four weeks later	30.93
cc	66	46	five weeks later	24.80

DIGESTIBILITY AND RELATIVE FOOD VALUE.

Now, it will be readily understood that, other things being equal, the food value of any foodstuff must be proportional to its digestibility. Thus, in some experiments I carried out at Roseworthy, I found that the digestibility of the dry matter in wheaten hay cut at full bloom was represented by 54.32 per cent., whereas the digestibility in overripe hay was represented by only 48.83 per cent.; clearly, other things being equal, of the two samples the more digestibile hay must be the more valuable.

These differences, however, are far more pronounced when we compare together various foodstuffs differing in type. I have illustrated this fact in Table XI., in which is indicated the digestibility respectively of wheaten hay, bran, and cocoanut oil cake.

Table XI.—Showing Digestible Organic Constituents in Wheaten Hay, Bran, and Cocoanut Oil Cake.

Digestible Constituents.	Wheaten Hay Chaff.	Bran.	Cocoanut Oil Cake.
Protein	% 2.76	. % 12·99	0/ 0/6 14:66
FatFibre	0.48	1.85 2.19	12·24 6·24
Carbohydrates	33.66 44.81	40·32 57·35	34·71 67·85

From this one point of view, therefore—greater digestibility—bran has greater value as a foodstuff than wheaten hay, and cocoanut oil cake than bran, and in the approximate proportions of 45—57—68.

RELATIVE FOOD VALUE OF THE SEVERAL PROXIMATE CONSTITUENTS OF LIVESTOCK FOODSTUFFS.

A comparison between foodstuffs, however, which takes into consideration the relative digestibility of total organic matter only, cannot do full justice to the position; and this, because not all the proximate organic constituents of foodstuffs have the same food values. And it is this question which we must now take into consideration, if we wish to be in a position adequately to compare two or more foodstuffs.

There are two points of view from which comparisons of the kind are made:—(1) The relative amount of available energy to which each separate constituent may be said to correspond, or its fuel value; and (2) the quantity of body fat into which each separate constituent is susceptible of being converted.

It is on the whole simpler to adopt as a standard the power to produce fat, and in order to avoid confusion I shall pass over the question of relative energy, or fuel value.

In this connection, therefore, it has been shown, that if we represent the fat-producing power of digestible carbohydrates and digestible fibre by 1.00, the corresponding power of protein would have to be represented by 0.95, and of fats by 1.91 to 2.41 (1.91 in coarse fodders, 2.12 in grains and their by-products, and 2.41 in oil seeds and oil cakes).

On these grounds we are able to modify still further the figures setting out the relative feeding values of wheaten hay bran, and cocoanut oil cake respectively. These modifications are shown below in Table XII.

Table XII.—Showing relative Fat-producing Values of Digestible Constituents in Wheaten Hay Chaff, Bran, and Cocoanut Oil Cake respectively.

Digestible Constituents.	Wheaten Hay Chaff.	Bran.	Cocoanut Oil Cake.
Protein	% 2:59	12.21	% 13·78
Fat	0.92	3.92	29.50
Fibre	7·91 22·66	$2 \cdot 19$ $40 \cdot 32$	6·24 · 34·71
Total food units	45.08	58.64	84.23

On an improved basis of calculation, therefore, we find the three-foodstuffs to stand in the relative values of 45—59—84. Hence, whilst the relative value of wheaten hay has remained stationary, that of bran has risen slightly, and that of coacoanut oil cake very considerably.

FINAL STEP IN THE DETERMINATION OF STARCH EQUIVALENTS OF LIVESTOCK FOODSTUFFS.

Not yet, however, are we altogether in a position adequately to compare two foodstuffs differing wholly in type. From a final point of view, it may be stated that very few foodstuffs are what is termed "full value." By this it is meant that experimental results show that most complex foodstuffs fall short in final results of what might have been expected of them on a basis of their general composition.

A limited number of foodstuffs are, however, "full value"—i.e., when fed to livestock they give rise to the development of the same amount of heat or energy, or to the same amount of new tissues, that would have been expected from the consumption of a mixture

of similar quantities of pure food constituents. Of such are most of the oil seed cakes, potatoes, the huskless grains (wheat, maize, rye, rice, etc.), dry gluten, and various animal products such as lean flesh, milk, etc.

In the great majority of cases, however, direct experiments tend to show that most foodstuffs in current use are below "full value." Wheaten straw, for example, represents an extreme case of this kind—it is said to be 60 to 70 per cent. below "full value" as determined from its normal composition. This loss of value, characteristic of the coarser types of foodstuffs, may be accounted for on the following grounds:-When a low value foodstuff, such as straw, is consumed, a good deal of energy is wasted in the general work of mastication and digestion, with the result that material that might have been stored up in the body in the shape. of fat is absorbed in the laborious process of breaking down the foodstuff and rendering it available to the internal mechanism of the animal. In extreme cases the position may be said to be analogous to that of an engine, in which all the energy it was capable of developing was absorbed by its internal mechanism, leaving little or no power over to do the work required of it.

In this connection it has repeatedly been shown that this loss of value of coarse foodstuffs is more or less intimately connected with the proportion and the relative condition of the fibre present. And it is on these facts that the relative values of foodstuffs are usually determined.

Thus, then the figures indicated in Table XII. represent no more than what may be termed "food units"—in each case they will call for correction according as the foodstuff in question approaches more or less to "full value." In Table XIII., which follows later, I have indicated in a special column the percentage value ascribed by Kellner to various foodstuffs.

For the coarser foodstuffs, such as hay, straw, etc., it is customary to subtract from the food units, as indicated in Table XII., 0.58 for every 1 per cent. of fibre originally present in the foodstuff. In cases of green forage, if the proportion of fibre is 16 per cent. or over, it is customary to make the same deduction; if 14 per cent., 0.53 for every 1 per cent. of fibre present; if 12 per cent., 0.48; if 10 per cent., 0.43; if 8 per cent., 0.38; if 6 per cent., 0.34; and if 4 per cent. or less, 0.20.

Let us consider how this question of "full value" affects the position of the three foodstuffs we have had under consideration.

And first as to wheaten chaff. Reference to Table X. will show the percentage of fibre in normal wheaten hay chaff to be 24.4.

Hence (24.4 x 0.58=14.15) must be subtracted from the total food units indicated in Table XII., viz. (45.08—14.15=30.9). This final and definite figure—30.9—represents what is known as the starch equivalent of standard wheaten hay, and is the basis of comparison with all other types of foodstuffs, whatever their nature. Essentially this figure means that 100lbs. of wheaten hay chaff have the same feeding value as 30.9lbs. of pure starch.

Bran, on the other hand, is said to have a feeding value of 77 per cent. of "full value." Table XII. shows the food units in bran to be 58.64, hence its intrinsic value as a foodstuff, or its starch equivalent would be $(58.64 \times 0.77 = 45.27)$.

Finally, cocoanut oil cake is a "full value" foodstuff, and it follows that its starch equivalent is represented by the sum of its food units, namely, 84.2.

Hence, in final comparison, the three foodstuffs—wheaten hay chaff, bran, and cocoanut oil cake—stand in the matter of food values relatively to one another in the following proportions:—30.9:45.2:84.2. Or, in other words, the feeding value of one ton of wheaten hay chaff is equivalent to that of 77 bushels of bran, or that of 71/3rd cwt. of cocoanut oil cake.

THE EQUIVALENCE OF LIVESTOCK FOODSTUFFS.

We set out to determine the equivalence of livestock foodstuffs, and we can now see that this depends in final analysis on the starch equivalents of the foodstuffs compared. The starch equivalents themselves are based on the extent to which foodstuffs approach "full value"; on the number of food units the foodstuffs represent, and on the relative digestibility of these foodstuffs. It will be clear therefore that this equivalence of foodstuffs can be turned to practical advantage only with full information on these various points. Some of them have already been given earlier in Table VIII. I have summarised below in Table XIII. additional matter on the subject, taken mainly from Kellner's tables.

Table XIII.—Showing for various Foodstuffs within local reach Digestible Constituents, Percentage Value, and Starch Equivalents.

	Diges- tible Protein.	Diges- tible Fat.	Diges- tible Fibre-	Diges- tible Carbo- hydrates.	Value.	Starch Equiva- lent.
T. (%	%	%	%	%	%
Roots— Carrots	0.8	0.1	0.7	8-9	87	8.7
Mangolds			0.3	8.3	72	$6 \cdot 3$
Potatoes	1.1			18.9	100	19.0
Swedes		-	0.9	7.6	85	7.5
Turnips	0.6		0.3	5.5	77	4.6

Table XIII.—Showing for various Foodstuffs within local reach Digestible Constituents, Percentage Value, and Starch Equivalents—continued.

Community 2 of contag	o ,,	111000 1500			001101	
	Diges- tible	Diges- tible	Diges- tible	Diges- tible Carbo-	Value.	Starch Equiva-
	Protein.	Fat.	Fibre.	hydrates.		lent.
	%	%	%	%	%	%
Green forage, &c.—				a #		
Field cabbage	1.8	0.7	1.7	6.5	94	9.4
Red clover		0.5	3.0	6.3	86	10.2
Crim son clover	$2 \cdot 1$	0.5	3.5	5.2	81	9.0
Italian rye	2.1	0.5	$3.6 \\ 4.0$	7.7 7.4	85	11.4
Perennial rye		0·3 0·4	2.9	6.3	81 79	10·6 9·1
Lucerne (before flowering)		0.4	3.5	5·7	74	8.4
Lucerne (full bloom) Maize		0.3	3.1	6.7	83	9.1
Mustard		0.2	1.5	4.9	90	7.2
Oats (early growth)		0.4	$2 \cdot 3$	5.2	89	8.5
Oats (in bloom)		0.4	4.9	6.5	75	10.0
Barley (early growth)		0.3	$3 \cdot 1$	6.4	80	9.6
Barley (after bloom)		0.3	6.4	12.1	79	16.0
Pease (in bloom)		0.3	$2 \cdot 3$	3.2	83	6.6
Field beans (in bloom)		0.5	1.6	4.1	88	7.1
Rape		0.5	1.9	3.9	87	7.0
Rye		0.5	4.9	7.0	80	11.3
Sorghum		0.2	$3 \cdot 3$	5.8	79	8.1
Sainfoin		0.4	2.5	$6\cdot2$	85	9.5
Vetches	2.9	0.3	$2 \cdot 2$	4.0	86	$7 \cdot 3$
Hays-						
Wheaten hay (full bloom)	4.0	0.4	12.9	29.9		31.4
Wheaten hay (standard)		0.5	7.9	33.7		30.9
Wheaten hay (overripe)	3.3	0.8	6.0	33.1	-	29.6
Red clover hay		1.7	11.3	26.0	70	31.9
Oaten hay (in bloom)		1.7	18.1	26.7	67	35.2
Lucerne hay (before bloom)		1.1	11.3	21.1	63	26.5
Lucerne hay (in bloom)	9.7	$1 \cdot 2$ $1 \cdot 6$	$\frac{13 \cdot 2}{12 \cdot 6}$	18.1	57	22.4
Pease (in bloom)		1.0	14.9	$\frac{20.5}{26.6}$	$\frac{66}{73}$	27.8
Italian rye grass	1.1	1.4	14'0	20.0	10	35-6
~ .						
Grains—	10.0	1.0	0.0	00 -	45.00	=0.0
Wheat	_	1.2	0.9	63.5	97	73.2
Rye	9·6 7·1	1·1 3·9	1·0 1·3	63.9	95	71.3
Maize Oats		4.0	2.6	$65.7 \\ 44.8$	100 95	81.5
Barley (malting)		1.9	1.3	62.4	95	59·7 69·8
Barley (Cape)		0.5	5.8	5.2	95	60.0
Field beans	22.1	$1 \cdot 2$	4.1	44.1	97	66.6
Pease	19.4	1.0	$2\cdot\hat{5}$	49.9	98	68-6
Carob beans	4.0	0.7	3.7	65.5	97	71.7
William Dammadanta						
Milling By-products—	19.0	1.0	0.0	40.0	proc prop	4~ 0
Bran	$13.0 \\ 12.1$	$\frac{1.8}{2.5}$	$2 \cdot 2 \\ 2 \cdot 2$	40.3	77	45.2
Pollard	12.1	2.9	2.2	50.9	79	$55 \cdot 2$
Straws and Haulms—	0.0	0 =	0	70.0		
Barley straw	0.9	0.5	21.3	19.0	46	19.0
Oaten straw	1.3	0.5	20.9	16.5	43	17.0
Wheaten straw	0.2	0.4	22.0	13.1	32	11.5
Maize straw	1.7	0.5	23.5	17.2	47	20.3
Rye straw	0.6	0.4	22.0	12.9	30	10.6
Pea haulms	$4 \cdot 3$	0.7	13.7	18-5	44	16.2

Table XIII.—Showing for various Foodstuffs within local reach Digestible Constituents, Percentage Value, and Starch Equivalents—continued.

	Diges- tible Protein.	Diges- tible Fat.	Diges- tible Fibre.	Diges- tible Carbo- hydrates.	Value.	Starch Equiva- lent.
Refuse and Oil Cakes—	%	07 70	%	%	%	%
Sunlight oil cake	16.1	10.8	7.3	33.7	100	82.3
Copra cake	14.7	$12 \cdot 2$	6.2	34.7	100	$84 \cdot 2$
Undecorticated cotton cake	18.1	$6 \cdot 1$	4.0	13.4	84	$39 \cdot 2$
Decorticated cotton cake	41.3	8.6	1.8	14.5	97	$72 \cdot 3$
Linseed cake	28.8	7.9	4.3	25.4	97	71.8
Olive cake	$4 \cdot 3$	13.1	11.1	19.7	85	56.4
Palmnut cake	15.0	8.3	14.3	30.8	100	78.8

(To be continued.)

AGRICULTURAL EXPERIMENTS.—REPORT FOR YEAR 1914-15.

EXPERIMENTS WITH THE MANURING OF WHEAT.

Conducted by Mr. F. COLEMAN, at Saddleworth.

Mr. Coleman has for the last 10 years very carefully conducted experiments, having for their object the testing of various manures for wheat-growing on bare fallow. Mr. Coleman has set aside for this purpose a field, one-half of which is bare fallowed every year, the other half carrying the crops, and each half is pegged into plots, ensuring that each time the plots are cropped they occupy exactly the same space. As well as this, each plot receives exactly the same manuring every time that it is in crop, so that the longer these experiments are continued the greater will be their value.

The results from these plots have been published annually, together with some remarks by Mr. Coleman. For 1914, Mr. Coleman says:—"As the plots this season were some distance from any crops left for grain, they received a good deal of attention from sparrows. About one-quarter of plot 1 and a

little of plot 2 was practically cleared of all grain by these birds. The plots were all affected by bunt, though they were all sown with pickled seed. All plots were sown on May 21st, 1914, and harvested on December 1st, 1914." Rainfall during this period (seeding to harvest), 4.73in.

Table 1.—Showing Yields for 10 Years of Manurial Plots at Saddleworth. Each Plot Half Acre in Area.

	Pro	т1.	P1.0	от 2.	PLO	т 3.	PLO	от 4.	PLo	от 5.	PLO	т 6.	Рьс	т 7.	PLo	т 8.
	lcwt. Mineral Super.	per Acre.	lewt. Mineral Super	5ewts. Lime per Acre.	1cwt. Mineral Super.,	lewt. Mineral Super., Lewt. Sulph. of Potash, Lewt. Nitrate of Soda per Aere.		lowt. Bone Super. per Acre.		No Manure.		gewt, Sulph, or Fotash per Acre.	gewt, Sulph, of Potash and gewt, Nitrate of Soda —for first 7 Years, 2cwt, Mineral Super. for 3 Years		lcwt. Mineral Super.,	gewt. Nitrate of Soda per Acre.
	Bush	lbs.	Busl	ı.lbs.	Bush	.lbs.	Bush	ı, lbs.	Bush	ı.lbs.	Bush	.lbs.	Bush	. lbs.	Bush	. lbs.
1905	31	0	29	22	33	48	34	36	29	50	35	6	30	38	33	10
1906	32	20	34	10	32	22	33	56	23	40	33	34	24	42	36	8
1907	35	42	38	2	39	8	36	22	24	52	35	32	25	16	35	50
19:8	17	38	19	28	20	52	17	34	7	36	19	36	8	50	18	52
1909	31	42	32	54	35	6	80	40	24	32	29	34	23	18	33	34
1910	21	4	22	26	25	20	26	24	15	12	28	44	15	28	29	38
1911	21	54	24	0	24	40	24	44	15	30	24	6	15	34	20	40
1912	23	34	27	22	27	50	28	56	12	58	26	14	29	36	23	58
1913	26	22	26	36	25	14	24	3ห	4	56	22	44	21	10	20	34
1914	7	34	11	54	10	46	12	0	ā	56	10	56	12	34	11	44
Mean for 10	24	53	26	37	27	31	26	59	16	30	26	37	21 3 ye	7	26	25

Table 2.—Showing Increased Yield of Manured Plots over Unmanured Plot in 1914.

Plot 1	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.	Plot 8.
Bus, lbs. 1 38	Bus. lbs. 5 58		Bus. lbs. 6 4		Bus. 1bs. 5 0		Bus. lbs. 5 48

Table 3.—Showing Value of Increased Yield of Manured Plots over Unmanured Plot in 1914.

Personal and the second																	-				
	P	lot	1.	Plot 2.		Plot 3		Plot 4		Plot 6.		F	Plot 7.			Plot 8.					
Value of increase at			d.	1			1						£			i			1	s.	d.
3s. 5d. per bushel. Cost of Manure	0	$\frac{5}{4}$	$\overset{7}{0}$	1 0	0 9	$\begin{smallmatrix} 5\\10\end{smallmatrix}$	0	16 18	$_0^6$	10	0 5	9 6	0	17 11	$_{0}^{1}$	1 0	2 8	8	0	19 11	10 0
Net value of incrse.	£)	1	7	£0	10	7	£0	1	6	£0	15	3	£0	6	1	£0	14	8	£0	8	10

Value of various manures taken as:—Mineral superphosphate, £4 a ton; bone superphosphate, £5 10s. a ton; sulphate of potash, £14 a ton; nitrate of soda, £14 a ton.

Table 4.—Showing Increased Yield of Manured Plots over Unmanured Plot for a period of 10 Years; together with Net Value of Increase and Average Annual Increase.

	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 6.	Plot 7, 3 years.	
_	Bus lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs	Bus. lbs.
Increased yield for 10 years		ł	110 4	}		39 30	99 6
Value at 3s. 5d. per			1	1	1	£ s. d.	
bushel Cost of manure	14 6 4 2 0 0	17 5 9 4 18 4	18 16 1 9 0 0	17 17 11 2 15 0	17 5 4 5 10 0	6 15 0 1 4 0	16 18 7 5 10 0
Net value of increase	12 6 4	12 7 5	9 16 1	15 2 11	11 15 4	5 11 0	11 8 7
Average annual value of increase	1 4 7½	1 4 9	0 19 7½	1 10 3½	I 3 64	1 17 0	1 2 101

Plot 7, which from 1905 to 1911 inclusive, had received ½cwt. sulphate of potash and ½cwt nitrate of soda per acre, was dressed in 1912, 1913, and 1914 with 2cwt. of superphosphate, which dressing will be continued in future years.

EXPERIMENTS WITH POTATOES

Conducted by Messrs. Pope Brothers, of Mount Barker.

Since 1911 Messrs. Pope Brothers have been conducting experiments, in conjunction with the Department of Agriculture, with the growing of potatoes on land that a few years ago was considered quite unfit to produce payable returns of this crop. These experiments have taken the form of testing various fertilisers, and various methods of treating the seed before planting; in all instances using only a variety of known suitability to the district.

As the manuring of the plots in 1911-1912 was not continued in the successive years, no use can be made of the results obtained other than for a

6

Sewts. basic slag.

comparison between the individual plots for that year. These results have been already published and are to be found in the Annual Report of the Department of Agriculture for 1912-1913.

In 1912 the treatment of the seed and the manuring of the plots was rearranged, and since that date has been continued without alteration. The treatment of the soil is quite similar for all plots, and the same variety is used, so that any difference in yields should rest wholly and solely with the treatment received by the seed, or with the manuring of the plots.

The following table will give some idea of what has been done:-

Table 1.—Showing Treatment received by Plots planted with Potatoes at Mount Barker.

A.—TESTS WITH MANURES.

B.—SEED TESTS.

Plot.	Seed.	Manuring per Acre.
7 8 9 10	Boxed seed Seed, not boxed Small seed, not boxed Uncut large seed, not boxed	and lewt, sulphate of potash. 5 cwts. basic slag, 2cwts. dried blood, and

Details of the results of the three years' experiments with the above indicated treatments, together with the means of the yields, will be found in the following tables. For the years shown Messrs. Pope Brothers report as follows:—

1912-1913.

In June the field was prepared for peas, and sown with that crop about the middle of the month—a fortnight later than is their usual practice, owing to the very dry early winter. The crop of peas was ploughed under about the middle of October, the ploughing being done from 10in. to 12in. deep. With earlier seeding of the peas the ploughing-in could have been done in the end of September, when the moisture would have been conserved better. After this ploughing the soil was kept well harrowed and cultivated until planted. The planting was carried out in the week preceding Christmas. When the potatoes were up, they were horse-hoed once between the rows.

The yields of plots 9 and 10 for this year is partly accounted for by the fact that not enough land was prepared in the first instance, and it became necessary to plough for these two plots in the middle of November, when much moisture was lost owing to the weather being at that time hot and dry. The planting of these two plots was accordingly delayed until three weeks after the others.

1913-1914.

The season has been the worst we have known, there being no soaking winter rains; this made deep ploughing very difficult, and it was only accomplished by putting extra strength on to the plough. At no time since growing potatoes have we put so much work into our potato land. Had we received good winter rains for us to have conserved, or been blessed with summer rains, good results should have been obtained; but we had neither of these—hence the poor results shown.

Plots 1 to 6 were all planted with large imported seed; but in plots 7 to 10 we were bound to use our own seed, because of using large and small seed.

All plots planted in third week in December, 1913, and harvested during the third week of May, 1914.

1914-1915.

We consider the results for this season highly satisfactory, considering the character of the whole year. We think that plot 9 giving a higher yield than plot 10 is accounted for by the fact that the plants in plot 10 (large seed) made large vigorous vines, whilst those of plot 9 (small seed) were small and spindly; this necessitated the removal of more moisture in the early part of their growth by the large than the small plants, and, as the year remained dry, there was not enough moisture left in the soil to produce the tubers on plot 10. We think very much better results would have been obtained had the crop received a little more moisture.

All plots planted between Christmas and New Year and dug during the first week of June.

Table 2.—Showing Yields of Potatoes with Various Manures for the Years 1912-1913, 1913-1914, and 1914-1915.

Plot.	Manuring per Acre.	1912-1913.			191	13-19	14.	191	4-19	15.	Mean for 3 Years.		
_		T.	c.	Q.		c.		T.		Q.		c. 2	Q.
1	No Manure	7	1	2			3	1	8	0	3		
2	I. 15 tons farmyard manure, 2cwts. super.	12	17	0	1	12	2	3	7	2	5	19	0
	II. 115 tons farmyard manure	12	2	0	1	12	2		17	2	5	10	3
3	2cwts dried blood, 4cwts. super.	9	3	2	1	17	2	2	18	3	4	13	1
4	2cwts. dried blood. 4cwts. super.	1	•		-								
-	lewt. sulphate of potash	9	2	0	2	0	0	2	18	1	4	.13	2
5	Scwts. superphosphate	9	4	0	1	17	2				4	14	3
6	Sewts. basic slag	7	10	0	1	1	3	2	16	1	3	16	0

Table 3.—Showing	Yields of Potatoes	with Various	Seed Treatments for the
Yec	urs 1912-1913, 191	3-1914, and 19	14-1915.

Plot.	Treatment of Seed and Manuring per Acre.	1912-13.	1913-14.	1914-15.	Mean for 3 Years.		
7	Boxed seed 4cwts. super., 2cwts. dried blood, 1cwt.			T. C. Q. 3 2 1			
8	Seed, not boxed sulphate of potash	8 6 0	1 2 2	2 18 3	4 2 2		
9	Small seed, not boxed 5cwts. basic slag, 2cwts, dried blood.	4 3 0		2 18 3	2 13 1		
10	Uncut large seed, not \ lcwt. sulphate of potash	4 15 0	1 11	2 9 3	2 15 1		

EXPERIMENTS WITH VARIETIES OF WHEAT FOR BOTH GRAIN AND HAY.

Conducted by Mr. T. PENGILLY, at Aldinga.

For the past seven years Mr. T. Pengilly has been conducting, in conjunction with the Department of Agriculture, experiments with eight varieties of wheat each year to discover the most suitable all-round wheats—hay and grain producers—for the southern districts. The varieties handled have always received 2cwts, superphosphate per acre—and in all cases occupied 2 acres of land each, one-half of which was cut for hay, and the remaining acre harvested for grain.

The following tables set out in detail the yields of grain and hay produced by each variety:—

Table 1.—Showing Yield per Acre of Grain for all Varieties Tested.

Variety.	1908.	1909.	1910	11 ,	1912.	1913.	1914.		Mean.
	Bus. lbs.	Bus. lbs.	Bus, lbs.	Bus lb	Bus, lbs.	Bus. lbs.	Bus Ibs.	Yrs.	Bus. lbs.
White Tuscan	28 45	21 8	8 38	913 19	17 20	17 5	9 30	7	16 32
Yandilla King	24 42	13 33	6 58	129 38	20 1	24 44	11 11	7	16 15
Triumph	19 1	16 11	8 22	19 9	8 40	20 34		6	15 19
Gallant	24 19	16 36	4 32	15 56	10 19		4 24	6	12 41
Silver King	24 8	13 35	3 16					3	13 40
Baroota Wonder	21 14	15 14	6 16		<u> </u>			3	14 15
Dart's Imperial .		16 33	5 56		1-	23 52		3	15 27
Bluey				14 52	17\53		6 21	3	13 2
American No. 8 .					11 44	22 35	4 18	3	12 52
Le Huguenot			8 39	11 19				2	9 59
Majestic	27 21	12 0			- 3			2	19 40
Crossbred 53						8 24	4 46	2	11 35
Cumberland						23 52	13 31	2	18 41
Genoa				-	11 53			1	Potential
Late Gluyas							18 28	1	-
Gluyas						28 37		1	********
Bayah					14 58			ī	Browns
Phillis Marvel	20 25							î l	
Bunyip				10 35				î	Manage
Crossbred 28				11 41				î	
Crossbred 28				11 41				1	

	Means.	1 1 1 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3
	1914.	7. C. DIS VPS. VPS. 1 1 1 91 7 7 1 1 1 91 7 7 1 1 1 91 7 7 1 1 1 91 91 91 91 91 91 91 91 91 91 91
ves Tested.	1913.	2 15 15
all Varset	1912.	2 11 2 2 2 19.
of Hay for	1911.	7. C. Liss. 11. 13. 79. 11. 11. 11. 10. 11. 11. 10. 11. 11. 10. 11. 11
per Acre	1910.	3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
wing Yiek	1909.	7. C. 138. 2. 18. 99. 2. 2. 3. 34. 2. 2. 3. 34. 2. 3. 25. 3. 3. 36. 3. 36. 4. 12. 96. 4. 12. 96. 4. 12. 96. 4. 12. 96. 5. 13. 12. 96. 6. 13. 13. 96. 7. 13. 96. 7. 14. 79. 7. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15
Table 2.—Showing Yield per Acre of Hay for all Variches Tested	1908.	7. C. LIS. 3 12 102 2 8 67 2 5 11 2 17 26 2 9 57 2 11 99
TAB	Variety.	White Tuscan Yandilla King Triumph Gallant Silver King Baroota Wonder Barota's Imperial Bluey American No. 8 Le Hurnenot Majestite Crossbred 53 Cumberland Genoa Late Gluyas Gluyas Bayah Philis Marvel

EXPERIMENTS DEALING WITH THE STOCK-CARRYING CAPACITY OF VARIOUS FODDER CROPS.

Conducted by Mr. T. PENGILLY, at Aldinga.

As well as conducting cereal experiments at his farm at Aldinga, Mr. Pengilly has for the last four years tested the sheep-carrying capacity of various fodder crops. As these experiments are finished on Mr. Pengilly's farm, we take this opportunity of publicly thanking him for the careful and very thorough way that he has conducted these experiments for the Department of Agriculture.

These forage crops have each been grown on 2-acre fields securely fenced off from each other, so that sheep could be kept in them without any danger of them roaming into other plots.

The "natural herbage" plot has not been cultivated, but received the same dressing of manure as did all the other plots. This manuring consisted of 1\frac{3}{4}cwts. superphosphate per acre in 1911, 1912, and 1913, and 1\frac{1}{4}cwts. in 1914.

The plots have received the following amounts of seed each year:—Italian rye-grass, 30lbs. per acre; oats, 60lbs. per acre; peas, 120lbs. per acre; barley, 75lbs. per acre; rape and mustard, 5lbs. and 2½lbs. respectively per acre.

The individual plots have carried sheep for the year 1914, as follows:

Natural Herbage.—Eighty-eight sheep for four days, 99 sheep for three days, 157 sheep for three days, 157 sheep for one day equivalent to 1.75 sheep per acre for a year.

Italian Rye Grass.—Ninety-nine sheep for nine days, 151 sheep for eight days, 157 sheep for four days, 157 sheep for three days; equivalent to 4.38 sheep per acre for a year.

Oats.—One hundred and forty-seven sheep for nine days, 151 sheep for seven and a half days, 157 sheep for three days, 157 sheep for one and a half days equivalent to 4.33 sheep per acre for a year.

Peas.—One hundred and fifty-seven sheep for 14 days; equivalent to 3.01 sheep per acre for a year.

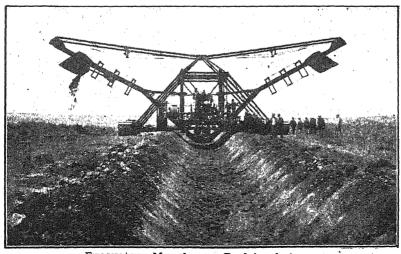
Barley.—Ninety-nine sheep for nine days, 100 sheep for six days, 157 sheep for four days, 157 sheep for one day equivalent to 3.12 sheep per acre for a year.

Rape and Mustard.—One hundred and fifty-one sheep for nine days, 151 sheep for six days, 157 sheep for two days, and 157 sheep for two days; equivalent to 3.96 sheep per acre for a year.

The following table shows the carrying capacity of the various feeds for four years:—

Table 1.—Showing Equivalent of the Different Fodder Plots in Number of Sheep per Acre per Year for each of the Years 1911, 1912, 1913, and 1914, and the Means of the Four Years.

	1911.	1912.	1913.	1914.	Means.
Natural herbage, uncultivated but fertilised. Italian rye grass Oats Peas Barley Mustard and rape.	3·89	2·73	4·26	1.75	3·16
	3·67	3·40	6·22	4.38	4·42
	3·92	3·07	6·19	4.33	4·38
	2·17	3·38	4·23	3.01	3·20
	4·36	3·55	6·00	3.12	4·26
	3·67	3·65	5·64	3.96	4·23



Excavator, Mypolonga Reclaimed Area.

FIELD TRIAL OF AGRICULTURAL IMPLEMENTS.

NORTHERN YORKE'S PENINSULA FIELD TRIAL AND SHOW SOCIETY.

The Northern Yorke's Peninsula Field Trial and Show Society, which was founded in 1894, justly lays claim to having exercised a considerable influence for the good of farming practice in the area which it serves.

The first trial under the auspices of the society was held at Bute on July 31st, 1895, and since then, as a general rule, one, and sometimes two fixtures have been held during each year.

The objects of the society as set out are as follows:—To hold at stated times a field trial of agricultural and horticultural implements and machinery, a show of stallions, and, if thought advisable, a show of other horses, cattle, sheep, pigs, vegetables, fruit, and other products, at such time and place as may be agreed upon.

The society consists of an amalgamation of six branches of the Agricultural Bureau, *i.e.*, Arthurton, Bute, Kadina, Paskeville, Pine Forest, and Port Broughton. The members of these branches constitute the trust body which is responsible for all liabilities of the society.

The officers consist of a president, vice-president, treasurer, secretary, and auditors. The secretary, who must be a member of one of the affiliated branches, is paid for his services. The officers are elected annually, the annual meeting being held in February of each year. A general committee is constituted by the election of two delegates from each branch, this body being for the purpose of arranging the localities and dates of proposed trials and shows.

An executive committee, which includes in its personnel the president, vice-president, secretary, and treasurer *ex officio*, has full power to execute and transact the business of the society, as directed by the general committee.

FINANCE.

The society secures funds from an annual subscription from each of the branches of £1 1s. Private individuals may, by paying an annual subscription of 3s. 6d., join the society, and secure access to

any trials and shows held during the year, but only members of the affiliated branches are entitled to a vote in determining the proceedings of the society.

PREPARATIONS FOR A FIELD TRIAL.

On the decision of the general committee to hold a trial at a stated time and place, the branch in the district selected proceeds to elect a small working committee, with a chairman and secretary, to conduct the business of the trial.

The procedure then adopted is for the secretary to enter into communication with manufacturers of agricultural implements, machinery, etc., with the idea of interesting them in the matter. The success of the fixture depends largely upon the measure of the support afforded by manufacturers. From the standpoint of the manufacturers, of course, the question resolves itself to a simple matter of business. A good attendance of interested agriculturists should prove a sufficient return to induce them to go to the expense of being represented. Therefore, the primal aim of the promoter of a field trial would appear to be to ensure, and convince implement manufacturers of the probability of, a good attendance at the fixture.

In view of this the constitution of the Yorke's Peninsula Field Trial and Show Society is peculiarly fitted to the requirements of a body which would seek to promote a field trial in so far as its extensive interested membership fulfils this first essential to success. The measure of success which attended the fixture held by the Northern Yorke's Peninsula Society at Melton on August 25th was sufficient to indicate that any organization, on the lines indicated above, is quite capable of meeting all demands likely to be made upon it

At this combined show and field trial, in addition to show sections for draught stock, blood stock, and horses in action (for which there were in all 65 entries), prizes were allotted for the following:—

Section D.—Ploughs to be shown at work.—(1) 5 or 6 furrow stump-jump plough; (2) 7 or 9 furrow stump-jump plough; (3) disk plough, any size.

Section E.—Cultivators to be shown at work.—(1) Stump-jump cultivator (no implement with mouldboard allowed to compete); (2) disk or mouldboard cultivator; (3) stump-jump harrow.

Section F.—Miscellaneous.—(1) Best collection of plough shares; (2) best collection of cultivator shares; (3) new agricultural implement of any kind which judges may consider of use in the district; (4) best collection of implements on the ground; (5) best stone gatherer.

Section G.—Ploughmen.—(1) Best ploughman, 5 or 6 furrow plough; (2) best ploughman, 7 or 9 furrow plough; (3) best strike out on ground; (4) best crown; (5) best finish; (6) best maiden ploughman, 5 or 6 furrow plough; (7) best maiden ploughman, 7 or 9 furrow plough; (8) champion ploughman.

In Section D, Class (1), each plough was required to plough about $1\frac{1}{2}$ acres; in Class (2) to plough about $2\frac{1}{2}$ acres. This was to be laid out in two half-ridges, and one crown in the centre of the plot. Each ploughman was required to plough his right hand land first. The depth of ploughing in Section D, Class (1) was 3in. and not more than 4in.; Class (2), $2\frac{1}{2}$ in. and not more than $3\frac{1}{2}$ in. The width of cut in every case was to be not less than 7in. to each furrow. In striking out, horses had to be driven. Competitors in the implement class were required to provide their own teams, and it spoke well for the enthusiasm of the competitors that there were no fewer than 75 working horses on the ground. In all, 69 entries were received for the four sections enumerated above.

The financial obligations incurred in connection with the trial were met by recourse to the following charges:—(a) Exhibitors in classes for which the first prize exceeded £2 were required to subscribe not less than 10s. 6d. to the society's funds; (b) subscribers of £1 1s. were permitted to place on ground for show, but not for competition, any implement, machine, or article; (c) entrance fees for each class fixed at the rate of 10 per cent. of the value of the first prize; (d) admission charge to ground.

The following were the officials:—Patrons, Hon. C. Goode, M.P. (Commissioner of Crown Lands), Hons. T. Pascoe, E. Lucas, W. Hannaford, and D. J. Gordon, M.L.C.'s Hon. John Verran, M.P., Messrs. J. F. Herbert, H. G. Tossell, and P. Allen, M.P.'s, A. Goodall, J.P. Rooney, and W. H. Sharman; president, Mr. J. P. Pontifex; chairman of committees, Mr. John Welch; vice-president, Mr. W. R. Stephenson; treasurer, Mr. W. H. Sharman; general secretary, Mr. L. E. Simon; secretary of field trial, Mr. W. R. Stephenson. Draught stock, Messrs. H. Allchurch, A. Kirk, A. W Davidson; steward, A. Klein. Blood stock and horses in action, E. J. Hann, A. W. Kelly, R. K. Kitto; steward, R. Cowan. Ploughs at work, Class I., M. R. Hall, W. H. Sharman, H. Cadd; steward, H. J. Coote. Class II., P. Roach, J. Welch, W. Rodda; steward, W. H. Crosby. Class III., T. H. Rodda, J. Trengove, G. H. Bamman; steward, O. V. Rudd. Cultivators at work, J. McDonald, T. R. Brinkworth, G. Bull; steward, L. A. Short, Miscellaneous, W. R.

Whittaker, F. T. Angel, R. Correll; steward, W. E. Lamshed. Class V., J. C. Price, A. Rodda, J. Francis; steward, W. G. Drewett. Ploughmen, Classes 1, 2, 6, and 7, S. Trengove, F. W. G. Heinrich, W. Frazer; steward, T. H. Howlett. Classes 3, 4, and 5, L. McCormack, W. Short, A. Goodall; steward, R. Montgomery.

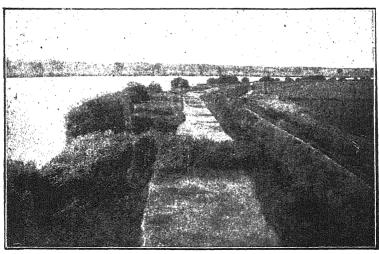
In the field trial of implement sections, referred to above, the awards were as follows:—

Section D.—Ploughs to be shown at work.—5 or 6 furrow stump-jump plough, C. H. Smith & Co., 91 1/3rd points; C. H. Smith & Co., 87 points. 7 to 9 furrow stump-jump plough, C. H. Smith & Co., 89 2 3rd points; C. H. Smith and Co., 86 1/3rd points. Disk plough, any size, C. H. Smith & Co., 84 1/3rd points H. V. McKay, 77 2/3rd points.

Section E.—Cultivators at work.—Stump-jump cultivator, J. Arms, 82 2/3rd points; W. H. May & Sons, 78 points. Disk or mouldboard cultivator, 10 furrows or over, W. H. May & Sons, 86 1/3rd points; stump-jump harrows, C. Smith & Co., J. Arms.

Section F.—Miscellaneous.—New agricultural implement, any kind, not worthy; best collection of implements, C. H. Smith & Co., J. Arms; stone gatherer, C. H. Smith & Co.

Section G.—Ploughmen.—Best ploughman, 5 or 6 furrow, G. Wilson, 85 points; W. Sharman, 82 points. Best ploughman, 7 to 9 furrow, R. Dinham, 84 2/3rd points; W. Wilson, 72 points. Best strike-out, G. Wilson, 17 points; W. Sharman, 16 points. Best crown, G. Wilson, 16 points; W. Sharman, 15 2/3rd points. Best finish, W. Sharman, 15 2/3rd points; G. Wilson, 14 points. Best maiden ploughman, 5 or 6 furrow, A. Rodda. Champion ploughman, G. Wilson, 132 points; W. Sharman, 129 1/3rd points.



River Murray Reclamation Works.



The Late Lieutenant-Colonel F. M. Rowell, Officer in charge of 3rd Brigade on Gallipoli Peninsula, whose death was reported on the 17th August.

[Block kindly lent by the Proprietor of the "Chronicle."]

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THE LATE LIEUTENANT-COLONEL ROWELL.

A VALUED OFFICER OF THE DEPARTMENT OF AGRICULTURE.

On Tuesday, August 17th, news was received of the death of Lieutenant-Colonel Frank Milton Rowell, the officer in charge of the 3rd Brigade on the Gallipoli Peninsula, and, prior to the outbreak of hostilities in Europe, a much valued and highly respected officer in the Horticultural Branch of the Department of Agriculture.

The Lieutenant-Colonel was gazetted an inspector under the Vine, Fruit, and Vegetable Protection Act on February 5th, 1903, and was promoted to the position of senior inspector on August 3rd, 1911. In addition he acted as inspector under the Sale of Hay and Chaff Acts, the Fertilisers Act, examining officer under the Commerce Act, and quarantine officer under the Federal Quarantine Act.

A natural tact and frankness of manner endeared him alike to his fellow departmental officers and the public with whom he came into contact in the performance of his duties.

Lieutenant-Colonel Rowell had been connected with the military forces from the time of his youth. He held a commission for some years before being promoted to the position of lieutenant-colonel in charge of the 22nd Light Horse Regiment. At first as lieutenant and subsequently as captain he served with the South Australian Contingent in South Africa for about two years, during which he was engaged in active fighting in many severe engagements. As a reward for distinguished services he was made the recipient of the Queen's Medal with five clasps and the King's Medal with two. Whilst in South Africa he acted as provost marshal, and was attached to Colonel Henry's Imperial Staff for eighteen months, subsequently visiting England as a member of the Australian troops to take part in the Coronation ceremonies of King Edward.

He was appointed to the command of the Light Horse Regiment attached to the South Australian quota of the First Australian Expeditionary Force. His regiment was afterwards converted into an infantry section, and the Lieutenant-Colonel was selected to take charge of the 3rd Brigade on the former commander being invalided to England. At the time of his death Lieutenant-Colonel Rowell was 39 years of age.

The Director of Agriculture (Professor Perkins), with reference to the deceased officer, said—"We all deplore the untimely loss of Colonel Rowell, cut down in the prime of life, like so many others in these sad days. Bright, energetic, loyal hearted, a worthy scion of a public-spirited family, he leaves an irreparable void in the hearts of all who knew him. To his relatives our deepest sympathy goes out: we who knew him can realise, perhaps better than others, what his loss must mean to them. One thought, perhaps, should serve to temper our sense of loss: he fell, as he would have chosen, with arms in his hand, in defence of a noble cause."

The Horticultural Instructor (Mr. G. Quinn), in whose branch of the Agricultural Department the late Lieutenant-Colonel Rowell was engaged in his civil capacity, writes—"The late Lieutenant-Colonel Frank Rowell was, in my opinion, almost the ideal of what a public officer should be. He never permitted the ofttimes monotonous routine of work to dull that high sense of duty which seemed natural Notwithstanding this unswerving loyalty to the service, his natural tact, strong commonsense, and gentlemanly demeanor enabled him to perform what were often irritating tasks with the least possible annoyance to those members of the public who may have been temporarily inconvenienced thereby. It was these characteristics, denoting a strong yet sympathetic nature, which enabled him to come to the front in civil life, and which, had he lived, would undoubtedly have carried him to the highest ranks in the profession of arms, which he loved so well. Apart from his valuable assistance, Frank Rowell's cheery disposition has made his absence keenly felt in this section, and now, with no hope of his returning, we realise very fully indeed what it means to have lost a loval friend and trusted colleague."

COMPE

SEASONABLE ORCHARD NOTES ON PESTS.

By Geo. Quinn, Horticultural Instructor.

The advent of spring starts a new fight with the orchardists' enemies. The same stimulating influences which revive the movement in bud and root of the fruit tree exercise the same irresistible power over its natural enemies. The cycle of bud, blossom, shoot growth, and fruit production have each their parallel in the life history processes of the microscopic fungus and the minute insect. In starting field operations to prevent the ravages of these foes no fixed time or period as measured by day or month can offer such an effective guide as the vegetative evidences held out by the trees themselves.

Simultaneously with the unfolding of the flower from its scaly bud on the peach and nectarine should the fungicide be made to search the interstices of every bud on the tree, and so with the apricot, the apple, and the pear. By this practice the germinating spores of the fungi giving rise to the diseases commonly known as peach curl-leaf, the shothole, and the black spot may, to a very appreciable extent, be destroyed before they find an entrance into the tissues of the trees which serve as their respective hosts. On the other hand, the various animal pests—usually true insects—begin to awake from the torpidity of their winter stages of existence—whether it be egg, larva, or fully developed imago—and start out to run their brief courses, each and all of which is usually of an unreservedly evil character, judged from the viewpoint of the orchardist.

The old mother black aphis of the peach tree, who has lived a "waiting game" lurking behind the resting buds—usually upon twigs low down on the sunny side—instinctively knows the sap is beginning to move in the limb beneath her shelter, and that abundance of food will soon be available for her young brood. How quickly she can bring that brown brood into existence only the suffering peach-grower knows! The prematurely opened blossom or the excited, hasty attentions of scavenging ants climbing about his trees are invariably evidences which arouse his well-grounded suspicions anent the presence of this troublesome pest. In its snug silk-lined waterproof cocoon, hidden away beneath the cracked bark, in

the decaying knothole of the apple, pear, or quince tree—or any other tree adjoining these—in the fruithouse or fruit-case, or even in the folds of the orchardist's discarded coat left hanging since last fruit season in the packing-shed, the codlin moth caterpillar begins to bestir itself in the direction of taking on a stiffer masklike pupal coating. At a slightly later period it will emerge to take its marriage flight, and then settle down to the sterner process of depositing its eggs upon the newly formed apples or pears or leaflets adjoining them. From thence onward until the fruit season ends there should be no truce between the apple-grower and the "apple worm."

As the spring passes into summer and the showers become infrequent and the atmosphere drier, the red and black scale insects which frequent the citrus and olive trees respectively, or the so-called red spider (Bryobia mite), whose red translucent egg masses are found throughout the winter on the bark of the almond, plum, and other fruit trees, all begin, by the same inexplicable instinct, to foresee a good time ahead, and start to raise families almost as "numberless as the sands upon the seashore."

One primary fact of which everyone who sets out to repress pests—be they of vegetable or animal origin—should be fully seized, is that all organized objects are at their most vulnerable stage when in their infancy. In the inscrutable plan of creation the breeding powers of any organism may be said to be fixed in an inverse ratio to its size.

Hence it is that the smaller the individual pest the greater care becomes necessary in the application of the repressive measures used against it. To this end it usually follows that it is not ordinarily the great strength or killing power of the remedy which makes for effectiveness, but the thoroughness of its application and the selection of the right time when it should be utilized.

By way of example, it is found to be practically useless to apply a fungicide to the peach or nectarine to repress curl-leaf disease after the young green tips of the leaves have merged from their winter buds, and it is almost tantamount to shutting the stable door after the horse has gone to spray the apples or pears after the pustules of the "black spot" are seen upon the fruits or foliage, or the sawdust" like burrowings of the codlin moth caterpillar are seen protruding from those fruits.

In a series of experiments conducted with the utmost care upon rows of Elberta peaches over four seasons in the State Experiment Orchard at Blackwood, the copper-soda or Burgundy mixture yielded the uniformly best results in the repression of the curl-leaf fungus, as compared with Bordeaux mixture, pure bluestone, Bordeaux paste and powder, and lime-sulphur compounds. The strength or formula used was that suggested by Pickering in the Woburn reports, viz., 1lb. bluestone, 1lb. 14ozs, washing soda crystals to each 10galls, of water. In these trials a certain number of trees were sprayed once only with each compound, just as the flower-buds began to move, whilst others were sprayed a second time when the color of the petals was clearly displayed in the swollen buds. With the exception of the ordinary Bordeaux, viz., lime and bluestone, the single dressing of the copper-soda spray proved more effective than the two dressings given of any of the other compounds. In dealing with the curl-leaf a distinction may be made in the treatment in accordance with the climatic conditions incidental to the locality. For instance, one spraying given to trees as the blossoms unfold on the plains of Adelaide-with its 20 inches of rainfall and a rapidly drying spring atmosphere—proves as efficaceous as two applied to the same varieties at Blackwood, where the moisture in soil and atmosphere is more abundant and prolonged after the bursting of the leaves and the air temperatures are cooler, and that more particularly at night time.

In making Burgundy mixture advantage will be found in diluting the solutions of bluestone and soda whilst they are still separated with a considerable portion of the water to be used in making up the spraywash to its full volume. By way of example, if 10galls, only are to be made, dilute the soda down to 5galls, and the bluestone to a like volume before blending the two together to complete the wash. The same remarks will also apply to making ordinary Bordeaux mixture, with its lime and bluestone constituents. The advantage appears to rest in the lighter compound resulting from the combination, thus enabling it to float or remain in suspension longer, and in consequence assure a more even strength of the fungicide being spread over the tree by the sprayer.

This Burgundy mixture, or compound, has not been tested widely upon apple and pear trees to suppress the fusicladiums, or black spot, in this State, but owing to the ease with which it may be made and passed through the sprayer it is certainly worthy of being given an extensive trial, and that more particularly for the first spraying just as the buds unfold.

The more recently introduced lime-sulphur wash promises to be valuable, possessing as it undoubtedly does good insecticidal as well as fungicidal properties. It is claimed that for sprayings necessary after the fruits set it is superior to copper compounds in so far that it does not burn the foliage or russet the skin of the fruit. A formula worked out by an officer (Mr. A. A. Ramsay) of

the Chemists' Branch in the New South Wales Department of Agriculture, consists of the following quantities for making say 10galls. of stock solution:—

9½lbs. quicklime 20lbs. sulphur 10galls. of water.

To make this quantity an iron boiler to hold 14galls, should be available, and a permanent mark made on it at the 10gall, level of cold water. The lime and sulphur are placed in the boiler with half the required water—say 5galls.—and thoroughly mixed with a wooden stirrer. As the heat generated by the slaking of the lime may cause spurting, the operator should beware. When the mixing has been done the remaining 5galls, of water may be added, and the mixture boiled briskly for one hour after reaching boiling point.

During the first half-hour the mixture will froth up violently, and the air bubbles must be broken by persistent stirring to avoid boiling over and waste. To replace evaporation add small volumes of boiling water from time to time. When the mixture has cooled down, add cold water, if necessary, to bring the volume of wash up to the 10-gallon mark.

For winter spraying when trees are dormant and leafless, use of the above stock solution—1gall. to 7galls. of water.

For summer spraying on deciduous trees—1gall, to 28galls, of water,

For citrus trees (orange, lemon, etc.)—1gall. to 20galls. of water.

In all these operations fresh pure water is necessary.

This wash is worthy of extensive trial on almond, plum, and oth trees which have been persistently attacked by red spider or bryob, a mite, as sulphur appears to be fatal to most of the family to which it belongs.

As it is yet too early to start spraying for codlin moth, growers will be well advised to see that stocks of lead arsenate and the spraying apparatus are got together for ready use as soon as the blossoms fall from the apple and pear trees. In the meantime any old bandages or loose bark could with advantage be removed from the tree trunks and burnt. Any other lumber near by should be dealt with, and the windows and other apertures in the fruit-houses where fruit was stored in the previous year be covered with closely-meshed gauze to prevent the escape of moths as they hatch from their winter hidings.

CONSERVATION OF GREEN FODDERS AS ENSILAGE.

By P. H. SUTER, Dairy Expert.

Much has been written and said as to the improvements which can be made in the direction of increased milk and butter returns per cow as a result of the recognition by dairymen of the value of a pure sire (the progeny of ancestry which have proved heavy yielders).

Whilst there is no denying this fact, I have always held that thousands of our dairy cows under usual conditions during mid-winter and summer would, if supplied with a suitable palatable and succulent food ration, prove themselves highly profitable. If cowkeepers would give this immediate attention, returns would be quickly increased, and they would more readily discriminate between the loafer and profitmaker. This would lead to greater prosperity, contentment, and tend to the practice of breeding from better sires. In view of the bitter experiences of dairy cows during the leaner months of every year, the losses during the recent drought, and the abundant growth of all kinds of vegetation to-day, farmers can and should make special provision by conservation in the form of silage.

For many years this Department has strongly advocated the storage as ensilage of specially grown green crops or surplus natural vegetation. At Roseworthy Agricultural College several pits are filled annually; and a considerable quantity will be put down at Turretfield; in each case for the special purpose of supplying the bulk ration for the dairy cows.

As a result of the drought, there is a shortage of thousands of head in our dairy and other stock; as a result of this, values are abnormal, and are likely to remain so for some time.

The conditions in regard to pasture and food supplies to-day has happily changed, but it will take time before normal conditions can obtain so far as the revenue earning capacity of the farm is concerned. To rebuild dairy herds is not an easy matter, and will necessitate great outlay of capital.

NECESSITY FOR SAVING FEMALE CALVES.

Another matter which adds to the difficulty is the fact that very many cows which have been saved have not proved to be in calf. In many cases where owners have been fortunate in this respect, excellent female calves are being marketed for slaughter on account of the high values ruling for meat. Dairy folk should select a few heifer calves from their best cows and retain them for future dairy use, and not be

tempted by immediate calf values. Only the strong, well-furnished heifers possessing good dairy machinery should be kept, and just as many as can with certainty be properly developed. In view of the luxuriant growth of vegetation throughout the greater portion of the State, and the shortage of stock, the manufacture of silage and the retention of more hay upon the farm should receive the more serious consideration of provident and intelligent dairymen.

Good seasons, such as we are now experiencing, apparently gull cowkeepers and others into a false sense of security. They quite forget the great risk they are running with the coming of a bad grass season; its effect upon the cream, wool, or other cheque, and possible loss of stock.

Looking at the Commonwealth statistics for the past five years we find a very unsatisfactory state of affairs regarding the preparedness of those on the land for dry periods. For the year 1909-10 there were 70.344 tons of ensilage made upon 1,083 holdings, whilst in each successive year down to 1913-14 we find a heavy decrease in the amount put down; the figures for 1913-14 being only 44,242 tons made upon 530 holdings.

The following figures show the quantity of ensilage made in each State of the Commonwealth from 1909-10 to 1913-14:—

State.		dings 9-10.	1	ldings 10-11.		ldings 11-12.		ldings 2-13.		ldings 13-14.
New South Wales Victoria Queensland South Australia Western Australia Tasmania Federal Territory	364 518 79 81 28 13 —	Tons. 34,847 27,280 4,517 2,244 770 686 —	258 460 97 68 14 21 —	Tons. 29,616 25,969 5,804 1,503 414 1,073 47,581	158 371 61 39 9 34	Tons. 20,477 20,888 4,379 1,250 307 280 47,581	144 287 58 28 23 20 1	Tons. 18,509 17,877 4,156 2,200 479 424 10 43,655	129 270 75 16 22 17 1	Tons. 18,358 19,505 4,273 778 658 662 8

If the old order of things is to continue, and no provision made in the direction indicated, then assuredly our farmers will again suffer similar losses.

If stock do not suffer, then the owner must necessarily reduce the number kept (a weak spot at any time is the over-stocking of the farm), but with ensilage the ill effects of this would be materially reduced.

Ensilage manufacture is indeed a very old practice, it having been practised 200 years ago. In countries subject to dry spells, and where irrigation is not practicable to practice dairying without a silo is almost assuredly courting failure.

I would strongly recommend cowkeepers to put down as ensilage a certain quantity of their crop or surplus vegetation of any kind for use during the coming year.

September and October are the two months during which the work on the farm in most districts is slack, and it is during this period that vegetation and crops are sufficiently matured to insure a maximum of nutrition being distributed evenly throughout the plant.

Pits or stack ensilage can be made at little outlay of capital, but such practice is certainly attended with loss when compared with the results attending a properly chaffed pit or overground ensiled crop.

WHEN TO CUT THE CROP.

The food value of ensilage depends not only upon the crop grown, but also much upon the period of growth at which it is cut. The addition of legumes makes the silage of greater food value on account of the higher percentage of nitrogenous matter contained.

There is a general tendency to cut the crop too early. This results in the ensilage proving of lower food value, possessing too much acidity, and being accompanied by an objectionable odor. It is not then relished by stock, and is liable (if fed in bails) to convey an objectionable taint to the milk and butter.

The best time to cut is when the crop contains approximately 75 per cent. of moisture. At this stage the plants are flowering, the head being well formed, and a little too green for hay. The nutriment is then equally distributed through the whole plant. I have made butter and cheese from such ensilage, and the quality convinced me that the complaint levelled at silage, that it caused an objectionable taint, is unfounded if properly made and judiciously fed.

METHODS ADOPTED FOR ENSILING.

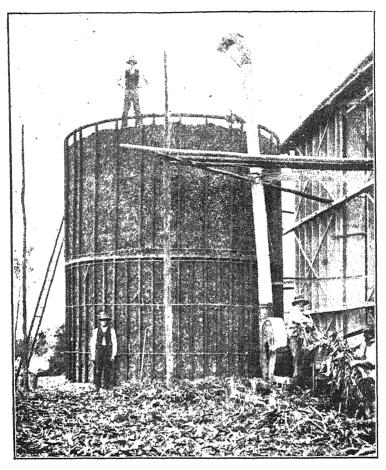
There are numerous systems adopted for ensiling:—(1) The overground steel-framed iron silo, wooden or concrete; (2) combined overground and pit silo; (3) stack.

The first-mentioned, steel-framed iron or wooden or concrete, are too costly for many farmers. With such structures the height for a 100-ton capacity may be averaged at 20ft. to 24ft. This necessitates an elevator or blower, which demands engine power on the farm. Iron or wooden silos of this capacity will cost from £85 to £90 erected on the farm. Concrete costs considerably more.

The overground silo has an advantage when the feeding of the stock commences, for it is emptied by gravitation, whereas with pits the chaffed silage has to be raised. The pit gives good results when put down in good holding ground and lined with boards at sides and ends,

and is certainly more economical to construct, a round or oblong structure being preferable to the square, as there is less friction, and the chaffed green stuff subsides and consolidates more evenly.

Those who intend putting down a pit should see to it that the site selected is slightly elevated, to allow of good drainage, and is in good



Wood and Wire-Netting Silo. Illustration taken from Agricultural Journal, N.S.W.

holding ground. The only disadvantage, if any, to this form of silo is the labor involved in raising the silage daily. Seeing that crops self-sown and otherwise are now well advanced, as also is surplus vegetation, there is little time for intending silage makers to erect any overground silos, unless it be those as erected in parts of New South Wales, where wire netting is used as shown in the accompanying plate.

By reason of the chaffed fodder being exposed to the surrounding air there is a good deal of loss around the sides. This structure was patented by the late Mr. Sylvester Browne, of New South Wales. It is claimed to be cheap, costing approximately for 100 ton capacity, £30, and there is less waste than occurs in a stack. For pit or overground silos, the crop should be chaffed rather longer than is the practice for hay chaff. The heavier portions of the crop will, on falling from the elevator accumulate in the centre of the heap, gradually forming a cone. This will result in undue waste, on account of the uneven shrinkage allowing admission of much air, causing it to mould for 1ft. to 1½ft. all



Stack of Maize containing 150 tons.

around. To obviate this, when chaffing, instead of a man standing in the silo, and raking the chaff to the sides as it falls, I recommend placing a cone-shaped frame directly under where the chaff falls in the centre of the silo. This will ensure better mixing of the chaff and save much labor. Chaffed green stuff should always be well trampled, especially around the sides of the silo, and should have pressure placed upon it. The deeper the body of green stuff the less is the weight required. Overground silos, also, should be weighted at a pressure equal to 3cwt. to 5cwt. per square yard. For pit silage, probably half a ton per square yard will be necessary.

Considering the advanced growth of green stuffs suitable for silage, and the aversion of so many to make any immediate outlay, it will, I feel, be well for them to adopt the stack system this season.

This open-air, or stack system, of making silage, whilst resulting in more loss around the sides and ends, has nevertheless proved a success.

The advantages of the system are that the stack can be built in the most convenient place in the paddock, thus saving labor, carting, and chaffing. If the stack is built in the corner of a paddock, possibly feeding can be done into any of the four paddocks at little cost. The



The Maize Stack after Weighting and Settling Down, at Hawkesbury College, N.S.W.

stack can be built to any size, and if the Johnston press is used, it can be readily removed from place to place as required. However, it cannot be so economically fed to stock with bran or other foodstuffs, as is the case with chaffed ensilage.

When selecting a site for a stack, choose the most convenient place for feeding, on ground almost level, with a slight fall for drainage. The stack requires no elaborate foundations. The ground should be levelled off, and old posts, timber, &c., should be placed close together, and have the spaces filled with clay or soil, or be covered with say 6in. The cutting, carting, and stacking can go on as fast as it can be delivered each day. Special care is necessary to stack evenly, placing the butts outwards, keeping the weight evenly distributed, and in binding. The sides and ends should be kept about 2ft, higher than the centre. The stack should be well trampled, and the sides kept perpendicular, otherwise there is likely to be a slipping on account of uneven shrinkage. Good stacking improves the quality, as it secures greater compactness and the more effectual expulsion of the air. During the process of building, it is well to sprinkle a few pounds of coarse salt on each layer of three or four feet. After each day's carting it will be noticed that the stack subsides very considerably. One should cart as much as possible each day. The last few feet of crop or pasture added to the stack should be the greenest or most tender, as this will pack more closely together, and prevent the temperature becoming too high. It will be found that the temperature is highest on top; half



Same Stack of Maize Opened and being Fed to Dairy Cows, showing Solid Face of Ensilage.

of stack will tend to be sweet or dark ensilage, and the bottom half is what is called sour ensilage, being more green in color and succulent.

If a stack of 50 tons is to be built, lay the foundation 25ft. by 20ft. A smaller stack involves too great a proportion of waste. When the stack has been built, and the material forming the eaves has been placed in position, wires may be placed across the top at intervals of about 3ft., overlapping sufficiently to allow of the ends being coupled to a round post, running parallel with the length of the stack, and held under the overlapping part of the posts forming the foundation. These posts should also have holes sufficiently large to admit a crowbar for leverage purposes at distances of every 6ft.

When all wires are connected, they may be strained up by using two or more crowbars. This is practically the same principle as that governing the Johnston press, only in the case of the latter the wire rope is attached to drums which are revolved by means of a lever. Where no provision is made for mechanical pressure, any material will do for weighting the stack. Whatever is used, it is essential that it should be as evenly distributed over the stack as possible.

Ensilage well made will keep for years. Last season a crop of wheat put down in a pit by Mr. Rankine, of Strathalbyn, over 20 years ago was opened, and the ensilage was in perfect condition.

All cowkeepers should note the following:-

ADVANTAGES OF ENSILAGE.

- 1. A cereal crop which would yield two tons of hay, if cut for ensilage, would make six tons of succulent fodder of greater digestibility.
- 2. Compared with hay for dairy cows, it is far superior as a milk maker.
 - 3. It can be made at a cost not exceeding 7s. to 12s. per ton.
 - 4. It wards off dry bible or impaction.
 - 5. It will not burn.
 - 6. It will keep for years.
 - 7. It maintains the health of all stock.
- 8. It is the best provision that can be made to maintain succulence of the food ration, and a continuous milk and cream supply.
- 9. It will increase the carrying capacity of the holding by 25 per cent. to 75 per cent.
 - 10. It will increase soil fertility.
- 11. It possesses the same laxative and corrective qualities as green pasture.
 - 12. All stock relish it.
 - 13. It is a thoroughly safe investment.
- 14. It requires less space to conserve than the same quantity made into hay.

Table Showing Material in Tons Required, according to Number of Cows Kept, in order to Feed 50lbs. to Each Cow Daily for Seven Months of the Year.

	Cows Milked.	Tons of Ensilage Required (Allowing for Waste.)
1 5 10 15 20 30 40		48 72 96

STORING AND PACKING EGGS.

By D. F. LAURIE, Poultry Expert and Lecturer.

This subject is of vital importance to those engaged in the egg trade, to farmers, poultry breeders, and consumers. In all countries, including Australia, the annual loss in eggs due to preventable causes is enormous. In order to ascertain definite facts, a series of experiments have been organised, and will be continued as desirable.

As a beginning, breeders should understand that the infertile egg is the egg for market purposes, and that the presence of male birds causes the fertilisation of the greater portion of the eggs laid by hens. As these fertile eggs contain life, they are prone to deterioration. That is so in a much less degree with infertile eggs.

Still of great importance are the following factors:-

- 1. Age of the egg.
- 2. Material used for packing the eggs.
- 3. Substances with strong odors which may, and do generally, taint the eggs.

STALE EGGS.

The age of an egg, and the duration of the time such egg is kept in store or in the farm before reaching the consumer, are points gener-Not only do stored eggs lose in quality, but they also ally neglected. lose in weight. I am not referring in any way to eggs held in cold These remarks affect eggs stored in the usual manner in stores, in transit, and in the home. The shell of an egg is porous; 65 per cent. of the egg is water. Each day an egg is kept a certain portion of the egg evaporates through the shell. The egg thus loses weight and the contents shrink, and the egg appears on examination to be only partly filled with egg substances. To the trader requiring a definite weight of eggs for a specific purpose this loss is important. He may be a manufacturer requiring a ton of egg substance for cake making. During the storage of eggs the daily and weekly loss may be sufficient to upset his calculations. Stale eggs travel badly; a full, fresh egg seldom suffers damage, but a stale, slack (partly filled) egg is damaged, because the white and the yolk mix. The loss in weight of eggs under ordinary storage is shown in the tables.

TAINTS DERIVED FROM PACKING MATERIAL.

The tests I. to IV. were arranged to show the effect on flavor due to contact with ordinary packing materials, and the results are stated, and are so marked as to teach their own lesson. They are sufficiently marked as regards effect on flavor to act as a warning. Potatoes, onions, stale vegetables, fish, kerosine, spices, and other strong-smelling substances usually found in stores (trade and domestic) are all unsuitable neighbors for stored eggs. Quality should be the watchword. The yolk of an egg contains about 30 per cent. of fatty substances. Fats and oils have a strong affinity for scents and aromatics generally, hence the ease with which eggs are tainted.

DAMP EGGS AND DAMP PACKING MATERIAL.

Although there has been some improvement in late years, there is room for more as regards the material used, and methods adopted on the farm and by traders. Wheat-head chaff (familiarly known as cocky chaff) is the commonly used packing material. On the average tarm the supply is exposed more or less to the weather, is subject to moulds, and is not always dry when used. In times of drought this material is scarce. The test made with damp wheat chaff shows, in conjunction with the case of the barrel of eggs, that very serious loss will occur. This test also explains why, when perfectly fresh eggs have been packed and are sent on a journey of some duration (especially in hot weather), reports of bad quality come to hand. In hot weather bacterial action in damp straw is favored, and is rapid.

The conclusion drawn from these tests are—

- 1. Eggs lose weight during ordinary storage, and stale eggs travel badly.
- 2. Packages and material should be dry and odorless.
- 3. Damp chaff will contaminate and render useless any egg, however high the quality when packed.
- 4. Damp eggs, even if packed in sweet, dry wheat-head chaff, will set up bacterial action, with rapid decay of the egg so packed.

EGG PACKING.

Records of tests made in laboratory at Parafield Poultry Station, to ascertain the keeping qualities of eggs, to note loss of weight, and effect on flavor of eggs so packed.

Note.—Underweight pullets' eggs were used in this test for economy, hence the low weight of eggs.

Duration of Tests—1, 2, 3, and 4 Months. Details of Material Used for Packing.

- No. 1. In old weathered, but dry, straw, such as would be found on the average farm.
- No. 2. In strawboard egg box, fitted with strawboard fillers and lid—no other packing material.
- No. 3. Packed in sound sweet wheat-head chaff; these eggs were covered in the chaff.
 - No. 4. Packed in bran and covered.
 - No. 5. Packed in damp wheat-head chaff.

EFFECT ON FLAVOR OF VARIOUS PACKING MATERIALS.

At the conclusion of the tests samples from each of lots 1, 2, 3, 4 were boiled for three minutes, and then tasted to note flavor. Before boiling the eggs were examined with a strong light, to note appearance. The results were as follows:—

On testing these eggs showed shrinkage due to evaporation. All the eggs were without apparent blemish. On removing top of egg the white and yolk had the appearance of fresh eggs.

- No. 1. On straw. Most shrinkage evident. Tasted strongly of straw.
- No. 2. Cardboard fillers. Tasted slightly of straw, due to the cardboard fillers.
- No. 3. Wheat-head chaff. Not tainted in the least. This good result was due to the use of perfectly dry sweet chaff, free from any fungoid growths.
- No. 4. Bran. During the test the bran became rancid. On boiling, the shells gave off a smell characteristic of sour bran. On tasting, the eggs proved to be tainted strongly.
- No. 5. This test was arranged to show the bad effects of using damp packing material, or of packing damp eggs, even in sound sweet wheathead chaff. A barrel of eggs, about 120 dozen, on arrival at its destination after a week's travel, was found to have suffered damage, as several dozen eggs were mouldy and contents black. Investigation showed that the eggs, prior to packing, had been washed, placed on a wire tray to dry, but had not been wiped dry with cloths. The wheat-head chaff used for packing was perfectly sweet. Subsequent packages of eggs which were washed and then carefully dried arrived in perfect condition.

A laboratory test was made to confirm this finding.

Infertile eggs, tested previous to packing, were packed in a receptacle, and damp wheat-head chaff was used. The test started on March 12th, and on March 19th they were tested, and found to show no signs of deterioration. Tested again on March 26th, and found still apparently good. Tested on April 9th, and all were bad, 10 being quite rotten. The longer period during which these eggs were unaffected was due to the smaller bulk of eggs, and packing material. In the barrel there were 120 dozen eggs, and about two sacks of chaff.

RESULTS.

All eggs were carefully tested with strong light at beginning of test. The following weights show loss due to evaporation during the tests:

Test 1. Twelve Eggs on Tray Exposed to Air in Laboratory on Straw.

	No. Egg.	First Weigh, 12/3/15.	Second Weigh, 9/4/15,	Third Weigh. 7/5/15.	Fourth Weigh, 4/6/15,	Fifth Weigh. 2/7/15.	Loss.	Loss.
		Grms.	Grms.	Grms.	Grms.	Grms.	Grms.	Per cent.
1		40.1	37.5	35.8	34.7	33.8	6-3	15.71
2		45.8	43.0	41.2	40-0	39-1	6.7	14.62
3		54.0	50.7	48.5	47.0	46.0	8.0	14.81
4		47.8	45.5	43.8	42.9	$42 \cdot 2$	5-6	11.71
5		41.7	39-1	$37 \cdot 3$	36.5	35-6	6-1	14-62
6		46.7	43.6	41.8	40.7	39.7	7-()	14-98
7		42.45	4()-1	38-6	37.8	37.0	5-45	12.83
8		4.7.7	44.3	42-1	40.6	39.5	8.2	17.19
9		46.5	43.2	41.0	39-7	38.5	8.0	17:204
10		46-65	43.8	42.0	40.8	39-9	6.75	14.46
11		46-1	4:3.:3	41.5	40.6	39.7	6.4	13.88
12		42.25	39.8	38-2	37-3	36-4	5-85	13-84

Test 2. Twelve Eggs Packed in Strawboard Egg Box fitted with Strawboard Fillers and Lid.

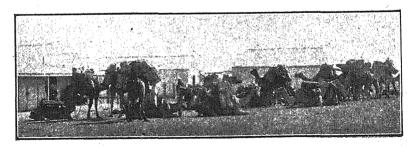
	No. Egg.	First Weigh, 12/3/15.	Second Weigh, 9/4/15.	Third Weigh. 7/5/15.	Fourth Weigh, 4/6/15,	Fifth Weigh, 2/7/15.	Lовы.	Loss.
		(Irms.	Grms.	Grms.	Grms.	Grms.	Grms.	Per cent.
i		53.7	51.1	49.5	48:3	47.2	6.5	12.104
2		49.0	46.0	44.2	43.0	42.0	7.0	14.28
3		48.15	46.6	45.3	44.6	43.8	4.35	9-03
4		48.15	45.5	43.9	42.8	42.0	6-15	12.77
5		45.0	42.0	40.2	39.0	38.0	7.0	15-55
б		45.0	$42 \cdot 1$	40.0	38.8	37.8	7.2	16.0
7		40.1	36.8	36.4	35.5	34.7	5-4	13-46
8		44.0	41.5	39.9	38.8	38-2	5-8	13-18
9		46.6	45.3	44.2	43.6	43.0	3.6	7.72
10		39.3	36.8	$35 \cdot 2$	34.4	33.6	5.7	14.503
11		39.7	37.3	35.7	34.8	34.0	5.7	14:35
12		49.2	46.4	44.6	43.4	42.5	6.7	13.61

Test 3.—Twelve Eggs Packed in Sound, Sweet Wheat-Head Chaff. These Eggs were Covered in the Chaff.

	No. Egg.	First Weigh. 12/3/15.	Second Weigh. 9/4/15.	Third Weigh. 7/5/15.	Fourth Weigh. 4/6/15.	Fifth Weigh. 2/7/15.	Loss.	Loss.
		Grms.	Grms.	Grms	Grms.	Grms	Grms.	Per cent.
1		44.5	41.2	39.3	38.0	36.8	7-7	17.303
2		42.7	39.1	36.9	35.6	34.5	8-2	$19 \cdot 203$
3		45.0	42.3	40.7	39.8	38.8	$6 \cdot 2$	13.77
4		46.0	43.4	41.8	40.9	40.0	6-0	13.04
5		44.6	42.5	41.2	40.3	39.6	5-0	11.21
6		41.0	38.7	37.3	36.4	35.6	$5 \cdot 4$	13.17
7		41.6	39.2	37.8	36.9	36.2	5.4	12.98
8		41.1	38.6	37.0	36.0	35.3	5.8	$14 \cdot 11$
9		47.0	44.5	43.0	42.0	41.2	5.8	12.34
10		44.2	40.6	38.5	37.2	. 36-1	8.1	18.32
11		45.7	43.8	42.5	41.7	41.1	4-6	10.06
12		45.0	42.6	41.1	40.2	$39 \cdot 5$	$5 \cdot 5$	$12 \cdot 22$

Test 4.—Twelve Eggs Packed in Bran and Covered.

	*	First	Second	Third	Fourth	Fifth		
	No. Egg.	Weigh.	Weigh.	Weigh.	Weigh.	Weigh.	Loss.	Loss.
	0.0	12/3/15.	9/4/15.	7/5/15.	4/6/15.	2/7/15.		
		Grms.	Grms.	Grms.	Grms.	Grms.	Grms.	Per cent.
1		$47 \cdot 3$	44.8	43.2	42.0	41.2	6-1	12.89
2		44.4	42.3	41.0	40.0	39.4	5.0	11.26
3		50.6	48.2	46.5	45·3 °	44.5	6-1	12.05
4		44.0	41.4	39-9	38.8	37.9	$6 \cdot 1$	13.86
5		43.0	40.7	39.5	38.4	37.7	5.3	12.32
6		49-9	47.0	45.2	43.9	42.7	$7 \cdot 2$	14.42
7		45.7	41.8	39.4	37.7	36.2	9-5	20.78
8		$42\cdot 7$	40.5	39.2	38.2	37-5	$5\cdot 2$	12-17
9		49.95	48.1	46.7	45.7	45.0	4.95	9.909
10		45.2	$42 \cdot 2$	40.5	39.1	38.0	$7 \cdot 2$	15.92
11		40-0	37-7	36.1	35.0	$34 \cdot 4$	5.6	14.0
12		42.7	40.5	39.0	38.1	37.2	$5 \cdot 5$	12.88



Camel Team Oodnadatta.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

INCUBATION.—HINTS ON HATCHING EGGS OF FOWLS, DUCKS, GEESE, AND TURKEYS BY NATURAL OR ARTIFICIAL METHODS.

The natural method is by means of hens (turkeys or fowls), and occasionally of ducks. Goose eggs are sometimes hatched by hens, but generally by geese.

Scarcity of Broody Hens.—The state commonly called "broodiness" is the outward sign of the maternal instinct, which, however, has been bred out of some birds, or some strains. As a rule the first symptoms of "broodiness" are a prolonged stay on the nest, tendency to ruffled plumage and resentment if disturbed, and a peculiar "clucking" noise when moving.

Owing to breeding for improved egg production, and consequent rejection of hens prone to broodiness, there is yearly an increasing searcity of broody hens available for hatching eggs. Even those breeds, such as Orpingtons, Wyandottes, Plymouth Rocks, Games, &c., which at one time 17 duced liberal supplies of "broodies" have come under the rule of selective preeding for eggs. Still the practice is followed by some of having early-hatched pullets of some of the heavy breeds which will come in to lay in autumn and later on become broody. The uncertainty as to when a hen will become broody is the chief drawback to natural incubation on a commercial poultry farm.

Inducing Broodiness.— Hens, ducks, and geese are not to be forced into "broodiness," but the brooding instinct may be aroused and hastened by allowing eggs to accumulate in the nest. The better method is to permanently keep half a dozen china nest eggs in the nests. Some hens may lay only 20 eggs, others 100 before showing any desire to sit. Ducks will often "sit" if they can "steal" a nest in some quiet place. Runners seldom sit. Geese, as a rule, sit after they have laid from eight to 20 eggs. China geese often lay 60-80 eggs. A turkey hen, which has previously been broody, may be induced to sit if confined in a roomy, darkened coop, and supplied with a dozen china eggs. The process may entail a wait of several days.

ACCOMMODATION FOR SITTING HENS.

On farms and premises where there is unlimited range and where there are no foxes, hawks, crows, or other predatory animals the hens often choose a

secluded spot—in a hedge, or elsewhere. When such nests can be found, it is an excellent plan, when the hen is broody, to remove the eggs she has laid and replace with some it is desired to hatch.

A small poultry house will serve. In one corner, in the ground hollow out a depression about 12in. in diameter and 3in. deep—line this with soft straw or dry grass and place in the nest a few china eggs. At night remove the broody hen to this nest and leave her undisturbed for a day or so, until sitting well. Provide water to drink and grain to eat—but not near the nest.

Dust Bath.—In one corner make a dust bath and keep supplied with dry earth, ashes, and a little sulphur. In this she will dust berself and destroy any vermin infesting her.

A special building may be erected providing hatching pens and outside runs—all accessible from a covered passage way at the back.

Vermin.—Red mites (Dermanyssus gallinæ and Leiognathus morsitans) must be kept in check. They breed rapidly in nests and attack the hens, generally at night, and often by day. The sucking lice (Lipeurus), biting lice (Menopons), and occasionally goniocotes, if unchecked, will multiply and so worry the hen that the hatch may be poor, or the hen may desert her nest. Any chickens hatched under a vermin-infested hen may be expected to die. All broody hens should be liberally dusted with a good insect powder, also the nests. Avoid the use of carbolic acid and similar strong-smelling compounds, as they destroy the embryo in the egg.

Scaly Leg is a condition due to a small parasite (Sarcoptes mutans) which invades the tissues of the scaly portion of the legs and feet of fowls, causing accumulations. Affected bens should not be used as mothers, as the parasite will infect the chicks. In emergency scrub the legs in warm soapy water and dress with balsam of Peru; do not use kerosine—it will affect the eggs.

Number of Eggs.—Do not place in the nest more eggs than the hen can well cover. This is especially important during cold weather. Over eagerness to hatch large numbers may result in disappointment.

Hatching.—As a rule the better plan is to leave the hen severely alone during hatching. Young hens, particularly, are nervous, and, in their anxiety, may tread upon and destroy, or seriously injure the chicks. Some breeders, however, make it a rule to take away the chicks as fast as they are hatched. Against this there is the risk of a chill—although with care there are few deaths from trampling and other causes. Chickens, ducklings, turkey chicks, and goslings require no feed for from 24 to 48 hours after they are hatched.

SELECTING EGGS FOR HATCHING.

1. Do not take any egg. Let each egg be laid by a carefully-selected, properly fed hen, which was mated with a male bird specially bred for the purpose in view.

- 2. Let the eggs selected be as fresh as possible. In nature eggs are sat upon soon after they are laid—or they are protected by the hen. Some eggs, like that of the ostrich, emu, and some other birds, are protected by a shell that permits but slow evaporation of the water content. Rapid evaporation, or long-continued slow evaporation, which takes place in a stored egg, is prejudicial to the future chick.
- 3. Reject any misshapen eggs, also those with rough shells, and those which are abnormally large or which are undersized.
- 4. An egg is an article of commerce. A small egg has not the food value of a large egg. An egg averaging slightly over 20zs, is a fair sample for both seller and buyer. Make the 2-oz, egg the minimum weight.
- 5. All dirty-shelled eggs should be soaked in water and then washed and dried with a clean soft cloth. For incubation no harm results from washing, despite assertions to the contrary.
- 6. Place a distinctive mark on each egg placed under a hen or in an incubator. Use an ordinary lead pencil, not the kind known as indelible.

TESTING EGGS.

The object in testing eggs after they have been incubated for a few days is to ascertain if they are fertile. Without breaking the egg and submitting the blastoderm to critical examination it is impossible to say if a fresh egg is fertile or not. Nor under any circumstances can one foretell the sex of the future chick. There are always cranks whose mental and moral obliquity prompts them to lay claim in these directions.

With white-shelled eggs the testing may be undertaken from the third to fifth day of incubation; the date depending on the eyesight of the tester. Brown-shelled eggs offer more obstruction to light, and, as a rule, one must wait until from the fifth to the seventh day.

Egg Tester.—A simple tester is a piece of cardboard 8in, square, in the centre of which an oval hole somewhat smaller than the average egg is cut, A strong light (kerosine lamp, gas, or electric bulb) is necessary. the card in one hand at a distance of a few inches from the light, and with the other hand hold the egg to the hole in the cardboard. The light passes through the egg and the cardboard screens the eye from other light rays. Various machines are made—the simplest is one in use on the poultry station. It consists essentially of a metal rectangular box divided into a compartment for the source of light and one for a reflector. The light is condensed by a lens (condenser) and is focussed on a mirror fixed at an angle of 45 degrees to the plane of the light rays. This throws the beams of light vertically, and they strike an oval hole in the top of the metal frame. This hole is protected (from heat of lamp) by a piece of asbestos packing, in which also is cut an oval hole. The egg to be tested is rested on this hole for a few seconds: the contents are brilliantly illuminated. One can test eggs very rapidly with such a machine, especially if using a strong acetylene lamp,

Fertile Eggs.—An embryo looks very much like a long-legged spider. The body of the spider is the gradually forming head and eye of the chick, and the leg-like processes are the blood vessels. The embryo moves slowly, and in case of doubt this evidence of life should always be looked for.

Infer ile Eggs.—An infertile egg is quite clear, and, according to the color of the yolk, has a more or less golden color. No spider-like body is to be seen. Care, however, is needed, as even experienced testers will overlook a fertile egg after the seventh day. Sometimes the embryo throws but little shadow, because there have been various alterations in the egg which obstruct the rays of light.

Broken Yolks.—A ring of blood denotes rupture of the vitelline membrane. Such eggs should be rejected.

Blood Clots.—These appear as small clots of blood, and may have come from the follicle in the ovary or from a ruptured capillary in the oviduct. If there is an embryo showing life the blood spot does not matter. Such spots may be, and frequently are, in infertile eggs.

Dead Germs or Embryos.—When testing eggs it sometimes happens that a dark spot is seen, generally about the size of a split pea. When the egg is held by a steady hand no movement is visible, but if the egg be shaken the motion is imparted to the spot. Such spots are embryos which have started growth but have perished. The cause is generally overheating incubators—very often the trouble is due to improperly fed breeding stock.

Second Test and Third Test.—Eggs should be tested again as follows:—Hen eggs, on the 12th and 19th days duck eggs, on the 12th and 26th days.

Percentage.—Ninety per cent. fertility (90 eggs out of 100 set) is an excellent record. Much higher and very much lower results are common. As a rule, the lower the percentage of fertility the lower the percentage of chickens, etc., resulting from the fertile eggs. This is the case especially when low fertility is due to the condition of the breeding stock.

Information.—A breeder who thus tests all eggs in process of incubation, whether under hens or in an incubator, knows whether the breeding males are effective or not. In any case a great saving of time results—as total infertility is not uncommon—and after five or six days the eggs may be rejected and a fresh sitting placed under the hen, or the machine may be refilled. Where hens are used it is a common practice to set three hens at a time. After testing, if the percentage of fertility be low, the fertile eggs from the three nests may be collected under one or two of the hens. The empty nest is refilled.

Chills.—In cold weather the process of testing must not be unduly prolonged, as a chill, fatal to the embryos, may result.

Period of Incubation.

Hen eggs nominally hatch on the 21st day. Leghorns and other light breeds generally begin on the morning of the 20th day, and the hatch is all over on the 21st.

Duck eggs are due to hatch in 28 days—sometimes the eggs chip on the 26th day. If the breeding stock have natural exercise (swimming in a pond) the hatch is quick and the ducklings much stronger.

Goose eggs vary from 28 to 30 days.

Turkey eggs generally hatch by the 30th day.

ARTIFICALL INCUBATION.

Artificial incubation is essential to success in commercial poultry-breeding, where time is an important factor. In China and in Egypt artificial incubation has been practised for thousands of years. The practice began in Europe early last century, although there are previous records of earlier attempts. Those interested may refer to works of reference dealing with the subject.

The modern incubator does not differ essentially from some of the earlier efforts. The main difference is a more easily understood system of regulation, and the heating arrangements are more perfect. There are two main types—the hot-water-heated and the hot-air-heated machines.

The hot-water-heated machines for a time suffered in comparison with the more convenient hot-air-heated types. The advent of the modern mammoth machine shows the better control to be had with hot water. Hot water machines may be of the tank type, the pipe type, or in the mammoth an elaborate system of piping. Small machines are heated by kerosine, gas, or electricity. The mammoth is heated by a furnace burning coal, coke, or charcoal, or a mixture of these.

In machines of this type the source of heat is directly above the eggs, and warmth is radiated from the bottom of the tank or from the pipes. In the older patterns of the tank type a large body of hot water was provided to ensure more constant and equable heat. It was argued, and rightly so, that a large body of water took longer to overheat, and in case of a failing lamp such a body of water would take much longer to cool down than a small quantity. Such machines were very heavy and were also costly. More perfect regulation and improved lamps do away with the need for large water capacity. Some pipe-heated small machines I have used were most excellent, but there is always more risk of leaks in piped machines than in tanks.

In the hot air machine the theoretical type provides for incoming pure air, which is heated and driven by expansion through distributing pipes, passing thence by diffusion through the egg chamber and thence outwards. Unfortunately, a good many hot air machines admit lamp fumes to the egg chamber, with disastrous results. The hot air machine depends upon the circulation

of hot air, the tank machine (also the pipe-heated machine) depends upon radiated heat warming the eggs. Hot air machines are light and portable. There is no tank to leak, but if the lamp fails the eggs are soon cooled down to danger point.

There are innumerable machines, both tank and hot air—some are better made than others. There are few which will not give good results in the hands of an experienced operator. Ignorance and prejudice will counteract the efforts of the eleverest incubator maker in the world. As regards preference—hot water or hot air—for average conditions one is as good as the other. For special eggs and in abnormal seasons the tank machines are more reliable. See moisture.

The mammoth machine is not new, it has lately experienced a revival. The Egyptian "mamals" or hatching ovens had capacities of 100,000 eggs and more. There were incubators of large capacity in this State 35 years ago. The furnace-heated pipe machine as used in America, and of which there are a few in Australia, is approaching perfection. Where large numbers of eggs are required to be hatched, the mammoth machine is very economical. It is quite reliable and easily controlled. It is built in sections, all heated from one source, but each section may be run at any degree of temperature (within certain limits, of course). The mammoth at Parafield has a capacity of 6,000 eggs, and has 12 half sections—the cost of coke is only 1s. for 24 hours—a very great saving on the use of kerosine in smaller machines of similar total capacity.

GENERAL INSTRUCTIONS.

It is not my intention to give a lengthy list of instructions. Every maker sends out instructions which ought to be observed for that particular machine. In general, however, there are points which may be strongly emphasized.

- 1. Success depends a good deal upon the room in which the machine is working. Let it be well ventilated. A kitchen with a big fire all day and none at night is a poor place. A well-ventilated underground room is excellent. If possible provide a special room for the purpose. As no hatching should be done in hot weather it does not matter much, in this State, whether the room is partly underground or not. If there is a hill or a bank handy to the house, an excellent ventilated room can be built at a low cost. Readers can get advice on this subject on application, and to generalise would only take up space.
- 2. Use only the best brands of kerosine. Where gas is used special pressure regulators must be provided. Electrically-heated machines require expert knowledge of wiring.
- 3. Use only the best thermometers. These naturally cost money. Cheap thermometers cannot be relied upon. All thermometers, even the best, are subject to variation and must be tested at intervals. The column of mercury may break and a portion of the mercury may recede to the upper end of the

tube. Such a thermometer would record a temperature perhaps several degrees under the temperature. Where several machines are in use buy a clinical thermometer with a Kew certificate and use it as a test.

- 4. Heat decreases in proportion to the square of the distance from the source of heat. Therefore the bulb of the thermometer should hang on a level with the top of the eggs. A thermometer hanging an inch above the eggs should show about 106° when the bulb of a thermometer resting on the eggs shows 102°. The exact proportion varies with the distances of each from the source of heat. All eggs should be on a level. That is why dished eggtrays are used. The curve corrects the amount of heat radiated towards the centre.
- 5. Do not overcrowd the incubator room. This is a common mistake. If you require a large number of machines, you must have more than one room or a larger room. See that it is well ventilated and free from lamp fumes.
- 6. Carefully select the eggs to be hatched. Do not use any over one week old if you want uniform results. You may place as many eggs in each tray or drawer as it will hold. They need not be in rows, and you do not need slats. Let the eggs touch. If you suspect that the fertility may be low, you may stand the eggs at an angle of 45° on their small ends.

Turning the Eggs.—Eggs so packed must be hand turned. After testing and removal of infertiles, the balance have room to lie on their sides. Do not turn the eggs at any rate for 24 hours—the modern practice advises even 48 hours. I have turned from the 12th hour twice a day, and had 95 per cent, hatch. It is better, if possible, to turn the eggs twice in 24 hours. The egg must be turned, otherwise the blastoderm will come in contact with the lining membrane of the shell and perish. Mammoths and even smaller machines are provided with extra trays to facilitate turning. One tray is placed over the other and inverted—then take the eggs from centre of tray and exchange places with those in the corners. As a rule the eggs in the centre receive more heat than those in the corners and outer row, hence the need for the foregoing action.

Airing and Cooling.—Experience years ago showed that airing and cooling depended on the weather, and also on the stage of incubation. For the first week, and in cold weather, turn eggs quickly and return to machine. In warmer conditions take your time. As incubation proceeds the time occupied in testing, turning, and cooling may be prolonged, but avoid a chill. You may accidentally leave a tray of eggs out of the machine for a whole night and yet have a good hatch, but do not do so too often. Do not turn the eggs after the "pipping" begins. The chick always works itself into a certain position—if you alter that position the chances are against a successful issue.

Moisture.—This is an important yet complex question. In incubation, if there is too much ventilation and if the atmosphere is too dry, there would be too much loss of moisture from the egg. You can retard loss of moisture, but you cannot put it back into the egg. Ignorance sometimes writes that this impossible act can be performed. The various constituents of the egg are intimately associated with the water. The metabolism and growth and future of the embryo depend upon a definite proportion of water at all stages of incubation. This is not generally known, and reference will not be found in books, but it is true. Again, the carbon dioxide and water (vapor) given off by the embryo are the two sole end products of the embryonic metabolism. They are intimately associated with the important work of slowly altering the structure and composition of the egg shell. The action of the respired carbon dioxide and moisture on the carbonate and phosphate of lime in the shell results in dissolution, and finally a brittle, easily fractured shell from which the chicken easily emerges. Therefore if there is too great a loss of moisture the process is not properly completed. The use of moisture pans, sand trays (a very old plan), wet flannels, &c., is merely to so charge the air in the egg drawer with moisture that there will be little if any loss of moisture through the porce of the egg shell. The carbon dioxide then has time to act, in solution, and the shell becomes brittle. It will be seen then that moisture and ventilation are jointly concerned. As regards carbon dioxide, a good deal of misdirected energy has been expended in America and elsewhere in determining the CO₂ content of an incubator. Anyone with a knowledge of embryology would know that a percentage much higher than safe for lung breathers was common during incubation. It is only now dawning on some that the CO₂ question has been both magnified and misunderstood. Moisture trays must be used more in dry weather than in a wet season like the present. In cold, frosty weather the moisture content of the atmosphere may be low. In warm, muggy weather it is often high, sometimes approaching saturation.

Dead in Shell.—Where the eggs are from first class, properly fed stock, and where the machines have been operated under good conditions, the dead-in-the-shell problem may be cleared up by reading the preceding paragraph. I consider undue loss of moisture from an egg serious during the first week of incubation, and in dry conditions should fill the moisture tray from the first.

A piece of flannel steeped in hot water and then, after lightly wringing, if spread over the eggs permits the escaping CO₂ to dissolve and soften the shell. This method should always be adopted when the eggs appear to have unusually hard shells. Under normal conditions the eggs, the day previous to hatching, should give out a hollow sound when tapped. If hard, then use the flannel. Duck eggs require more moisture, and the good effects of the flannel method are well known. The flannel should remain until dry, so as to avoid chilling the eggs.

Sprinkling.—This really is for the purpose of arresting the escaping CO_2 and so admitting of further action on the lime salts of the shell. There is always some risk of a chill. In a hot machine freely ventilated there is much evaporation from a wet surface—this means a lowered temperature. (Vide water bags and butter coolers.)

Disinfect, &c.-The moisture trays should be scalded and disinfected once or twice during the hatch. One reads of weak solutions of permanganate of potash and alleged wonderful effects. There is no need to bother, because the action is so short that it could have no possible effect on the embryo. It might do a little good in a dirty machine in the way of germ destruction. Of far more effect is a 2 or 3 per cent, solution of ordinary commercial formalin. After each hatch scrub the trays and inside of machine with warm soapy water. Then dry well and, later on, paint with the formalin solution. This is far better than burning sulphur, which does not act well save in the presence of moisture.

Records.

For each machine have a card recording the date when filling the egg trays, number of eggs, date of testing, infertiles removed, died during incubation, hatched, good, cripples, weak, dead in shell. Keep also a daily record of readings of incubator and room temperatures, weather, &c. Such records are instructive and very useful. The written record has a distinct value.

TABLE OF MACHINE AND ROOM TEMPERATURES.

Duration of Cooling and Airing.

The following is a rough guide to temperatures of incubator room, incubator drawer, and also period of cooling for the eggs, including time occupied in turning, &c. :---

Room Temporature,	Incubator, F.	Airing Time— Minutes, Third to Seventh Day,	Airing Time, Fifteenth to Pipping,
40-50 degrees	103° 1021°	10	15 20
50–60 degress. 60–70 degrees.	1028	20	30-50
70-80 degrees	1017.0	20	Up to I hour or
•		,	more,

During hatching the temperature may be from 103° to 104° (in cool weather).

HATCHING.

Let the chickens remain in the machine for 24 hours or so. Then remove to a well warmed brooder, 95°-100°, and gradually cool down to 90°. Be careful to avoid a chill—much loss from bowel troubles is due to such chills. More might be written. The essentials are given.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, August 11th. Present:—Mr. F. Coleman (Chairman), Messrs. A. M. Dawkins, Laffer, M.P., J. Miller, C. E. Birks, G. Jeffrey, G. Auld, C. J. Tuckwell, T. H. Williams, Col. Rowell, C.B., Professor Perkins, Mr. W. J. Colebatch, and G. G. Nicholls (Secretary).

FARM APPRENTICES

The committee appointed to consider the matter of the training of farm apprentices suggested that the Minister of Agriculture (Hon. C. Goode) should be recommended to make provision as circumstances warrant for the training of youths in manual operations on all Government farms, orchards, poultry stations, &c., on the lines indicated by the Director of Agriculture in his latest annual report. They also supported a proposal that scholarships, tenable at Roseworthy College, should be awarded annually to the most deserving and capable of the apprentices. At the instance of Mr. Jeffrey the Board decided to adopt the suggestions.

Bureau Congress.

With reference to the abandonment of the farmers' annual congress in Adelaide during September, the Director explained that in view of the Royal Agricultural Society having determined to forego its spring show, and the consequent fact that the attendance at the congress would be materially diminished thereby, and also of the necessity for economising in every possible way, the congress agenda committee, in consultation with the Minister of Agriculture, had come to the conclusion that it would be well not to have the usual gathering this year. He now asked the Board to ratify that decision. The Chairman said that he had not been in favor of the abandonment of the fixture, because he thought it was particularly desirable at such a time that the producers should have an opportunity to relate their experiences of the last year or two, and indicate the lessons which had been learned therefrom. The expense involved would have been far outweighed by the gains in the matter of valuable information disseminated. He hoped it would be possible to have a congress in March. Mr. Jeffrey moved—"That the Board heartily endorses the action taken by the agenda committee." Nobody realised more than he did the immense value of the annual gathering in connection with the Bureau, but the circumstances on this occasion were such that the fixture could not well have been held. The Chairman considered that some definite reasons for the non-holding of the conference should be included. Mr. Jeffrey emphasized the necessity for exercising economy in view of the effects of the war. "This is an example of economy," he added, "which the producers themselves should cordially approve of and emulate." Mr. J. Miller seconded the proposition, which was carried.

STORING GRAIN.

The Minister of Agriculture invited the Board to advance any suggestions relating to the matter which had been mentioned in the House of Assembly by Mr. Coombe, M.P., who had asked:—" Seeing that there may be a great difficulty in getting away the coming harvest, will the Minister consider the advisableness of providing storages at the railway stations and other places, if necessary"? The Chairman pointed out that no doubt many of the farmers, after the hard times through which they had passed, would want advances on their crops. If, by the storage of the grain, the granting of that assistance would be facilitated, many advantages would accrue, including particularly the maintenance of a steady market. The Chairman, Vice-chairman (Mr. Birks), the Director, Messrs, Dawkins (mover), and Laffer were appointed a committee to consider the subject, and report direct to the Minister.

Bonus for Shoot Scorcher.

The Chairman directed attention to the discussion at the recent conference at Lameroo on the desirableness of the Government offering a bonus for the construction of an economical and effective mallee shoot scorcher, and desired the Board to take action to that end. Mr. Laffer mentioned that before long he hoped to invite the members of the Board to inspect a machine which he confidently believed would meet all requirements. The machine was simplicity itself, and the essential heat was generated on the same principle as that of the primus stove. It would not weigh more than 6ewt., could be drawn comfortably by one horse, and would be able to carry sufficient fuel to last for two days. On the motion of Mr. Miller, seconded by Mr. Auld, it was resolved—"That the Government be recommended to grant a bonus for an effective shoot scorcher."

DESTRUCTION OF RABBITS.

It was decided to advise all Branches of the Agricultural Bureau to form themselves into vigilance committees with a view to actively engaging in the reduction of the rabbit pest.

JUDGING AT SHOWS.

A letter from the Redhill Branch suggested that judges at shows should be available to indicate to unsuccessful exhibitors those respects in which they might effect improvements in their exhibits. The Chairman agreed that there was some sound sense in the proposal, the adoption of which would certainly lead to the dissemination of much useful knowledge. Other speakers,

however, pointed out that very few judges would consent to act under such conditions. Finally the Board decided that it was an impracticable scheme.

CO-OPERATION IN HARVESTING.

Mr. J. Miller believed that one way of overcoming the shortage of labor difficulty in connection with the garnering of the forthcoming harvest would be for the farmers in the later districts to help those in the earlier ones, and for the latter to reciprocate when the former should need assistance. He related his own experience in similar circumstances. No doubt it would be found a profitable and satisfactory plan to bind as much of the wheat crop as possible and head or thresh the sheaves later. This would enable a good sample of grain to be obtained and supply of valuable fodder to be built up for future use. Members approved of the idea, and the Secretary was requested to bring them under the notice of the various Branches of the Bureau.

HARVESTING MACHINERY.

At the instance of Mr. Dawkins it was decided to suggest to the Minister that during the harvesting period the provisions and regulations under the Early Closing Act should be suspended in respect of establishments engaged in the sale of machinery parts, thereby facilitating the prompt replacement by the farmers of any breakages which might occur.

NEW BRANCHES.

Approval was given to the formation of new Branches at Yaninee, Myrla, and Mount Hope, with the following gentlemen as members:—Yaninee—H. T. G. Dunn, C. C. Tainsh, W. B. Hirschfeld, W. K. Johns, M. Daly, John Christian, Fred Christian, M. Nugent, F. J. Davies, John Rawling, Frank Mole, George Turley, George D. Parker, J. Lund, G. E. Opitz, J. McCarthy, W. R. Mitchell, F. J. Heylan, E. G. Khaumermann, G. C. Davies, E. Lund, P. Daly; Myrla—H. Fettke, W. Velteu, H. Braun, J. Auricht, P. Fettke, H. Schloithe, J. W. E. Schumacher, F. G. Auricht, C. Braun, H. J. Zibell, R. Gaulke, C. A. Ziersch, P. J. Voigt, B. Reimann, O. Voigt, G. H. Ziersch, W. Schier, B. O. Ziersch; Mount Hope—F. Myers, T. Speed, —. Stegemann, E. Hillier, A. Walker, W. Mahoney, J. Colbert, H. Myers, H. H. Myers, R. L. Myers, W. Winstanley, A. Ness, B. Ness, G. A. Vigar.

NEW MEMBERS.

The following gentlemen were approved as members of the various Branches named:—Pinnaroo—S. A. Bone; Wirrega—J. Purdie; Port Broughton—C. H. Excell; Woodside—B. A. Keddie, A. Morcom, P. Erdmann, E. E. Williams Bute—C. J. Shepherd Parrakie—J. O'Hara, R. L. Beddome, R. E. Jose Mypolonga—T. Nolan, —. Wiadrowski, C. F. Otto, H. C. Langly,

M. H. Manglesdorf, E. R. Rathman; Amyton-S. Gum, R. Gum, L. Mills, Petina-O. Whithall, H. H. Howard, Lyndoch—G. K. Martin A. Cameron; Halidon-H. Bud, J. Opie; Monarto South J. Daly; Connalpyn-E. Shaw, F. Balpitt; Paskeville-E. Drewett, C. Holman Wirrabara-C. Kranz; Milang-W. Smith, W. Moar, F. Hopgood; Beetaloo Valley-C. Cox, A. Clogg, W. Berry; Parilla Well-E. Penhall, S. Beckmann Mount Gambier-A. A. Mitchell, M. Fahey; Riverton-M. Dreckow, F. Eckersley; Booleroo Centre-E. J. Nettle, W. H. Nottle, S. Wallage; Riverton—C. A. Smith Beetaloo Valley-N. Young; Mantung-F. H. Poutt; Renmark—H. Payne, G. Payne, R. Beer, E. H. Birks; Warrow-J. Kennett, W. Kennett, J. Doudle, H. Doudle, A. Hawke, W. Wright, G. W. Walding, jun., T. Morgan, L. Wilson, J. Wilson, G. Hains, J. Puckridge; Pinnaroo-C. Pedler, C. R. Kitsai, L. L. Johnston, Parilla—S. J. Walton S. Antill, P. N. Dowd; Yadnarie-O. Forbes; Elbow Hill - F. Ramsay, F. Chilman; Arden Vale and Wyacca-W. Klingberg, J. Klingberg; Frances-L. Krohnetz, H. V. Gregory, D. Barrett; Myponga - A. P. Stock; Strathalbyn-D. Vaughan, J. Clezy, G. W. Montgomery Salt Creek A. Zerk Borrika—S. R. Haynes, A. E. Banerochse, W. H. Coombe; Coomooroo -N. S. Lillecrapp, C. Fogden; Mount Remarkable -W. G. C. Zwar; Julia -E. Carter, O. Reuther, G. Paterson, W. Gehling; Morchard J. A. Messenger, W. J. Martin, L. R. Jasper, J. H. Richards, L. Brown; Wilmington G. A. Stephens, J. W. Flavel, J. Freeman; Mallala-J. C. Catt, H. E. Temby Lameroo—Joseph Broadstock, Joseph Duffield, Fred Allenborrough; Clarendon-H. Morphett.

THE WHEAT MARKET.

LONDON (Previous Day.)

Date.

August 4 Firm.

5 Firm; Liverpool steady, but quiet.

Steady, but quiet. Firm; Liverpool market quiet. 10 Very firm and held higher.

Unchanged. 11 12 Unchanged.

13 Firm, rather dearer; Liverpool market firmly held at full rates, but inactive,

14

- 17 Quiet.
- 18 Steady; no quotation.

19 Steady, but quiet.

- 20 Steady; no demand.
- 21 Unchanged.
- 24 Dull.
- 25 Quiet.
- 26 Unchanged.
- 27 Quiet; no demand.
- 28
- Quiet; Liverpool market steady; no quotation.

In South Australia prices have remained at 7s. 6d. per bushel for ordinary f.a.q., on trucks, Ports Adelaide, Pirie, and Wallaroo.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on September 1st:-

BUTTER.—A continuance of the happy pastoral and agricultural conditions resulted in production increasing largely during August, and in consequence of this South Australia now actually has a surplus of butter, several shipments having been made to interstate markets. A very sharp drop was recorded, prices receding 9d. per lb. in one week alone, and rates at the end of the month were:—''Alfa,'' ls. 5½d. per lb.; ''Primus,'' ls. 4½d.; choice separators and dairies, ls. 2½d. to 1s. 3½d.; store and collectors', 11½d. to 1s. ½d. per lb.

EGGS.—The comparative shortage in production referred to last month continues to be noted, the number of eggs marketed being considerably less than the quantity for the same period of last year. Values in the early part of the month came back, but firmed again later on, the closing rates being:—Hen, 1s. 3d. per dozen; duck, 1s. 4d.

CHEESE.—The increase in production of milk has caused factories to put heavier quantities into this commodity, and values have eased in sympathy with the lowering rates of butter; present values being from 11d. to 11½d. per lb. for large to loaf.

BACON.—The turnover has been limited, the high prices interfering with consumption; factory-cured sides selling at 1s. 1½d. to 1s. 2½d. per lb.; hams, 1s. 2d. to 1s. 3d.

HONEY.—Last season's appears to have been exhausted, so that market is bare, and buyers are anxiously awaiting arrival of the new take. Prime samples are worth 5d. per lb.; beeswax saleable at 1s. $5\frac{1}{2}d$.

ALMONDS.—No alteration to report in this line, Brandis selling at 8d.; mixed softshells, 6½d. to 7d.; hardshells, 3½d.; kernels, 1s. 5½d. per lb.

LIVE POULTRY.—There is no doubt but that the high price of wheat has caused farmers to reduce their stocks, so that supplies coming forward are very short of trade wants, and consequently tall figures have ruled throughout the month, and are likely to continue from now on. Good table roosters, 4s. 3d. to 4s. 9d. each; nice conditioned cockerels, 3s. 6d. to 4s.; plump hens, 3s. to 3s. 6d.; ducks, 3s. to 4s.; geese, 5s. to 5s. 9d.; pigeons, 10d.; turkeys, from 10d. to 1s. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—The demand for potatoes has been very quiet, and the market has steadily eased during the past month. Supplies have come chiefly from Victoria. Onions.—A fair quantity of onions have been marketed from local sources, and the balance of requirements have been supplied by Mount Gambier and Victoria. Quotations:—Potatoes, £9 to £10 per ton on rails Mile End or Port Adelaide; onions, best samples, £10 per ton on rails Mile End or Port Adelaide; mediocre and inferior lines much lower.

SHEEP NOTES.

By Mr. Henshaw Jackson, Wool Instructor, School of Mines.

The amount of money yielded by each sheep on the farm largely determines the value of the flock.

Ticky sheep will not fatten well. See to it that the necessary dipping is done each season.

Kerosine injected into maggot-infested wounds of sheep will clear out the wriggling pests and ward off further attacks of the blowfly.

Sheep manure is three times as good as that from cows. It will pay you to collect your shearing shed droppings for use on the lucerne patch.

Ewes are the most nervous of all the live stock on the farm, and consequently are more susceptible to disease than any other animals.

Get rid of your common old flock rams and buy a pure-bred one to head the flock. Your neighbors will then soon open their eyes in surprise at the good sheep you are raising.

A ram's hard work comes in the breeding season; remember this, and don't let your sires get low in condition just when you want them at their best.

Having your ewes in good, healthy store condition at breeding time means a good lambing of strong and healthy offspring.

Land does not deteriorate with the running of sheep upon it, but yearly increases in fertility.

Breeding on a system of running the rams with the flock all the year round hardly comes under the head of good management.

RAINFALL TABLE,

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of August, 1915, also the average precipitation to the end of August, and the average annual rainfall.

And the second s										
Station.	For Aug., 1915.	To end Aug., 1915.	Av'ge. to end Aug.	Av'ge. Annual Rainfall	Station.	For Aug., 1915.	To end Aug., 1915.	Av'ge. to end Aug.	Av'ge. Annual Rainfall	
T. n Normy	T	;								
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.					
Oodnadatta	0.04	1.10	3.33	4.76	Spalding	2.39	14.06	.13.44	20.25	
Tarcoola	1.08	2.51	5.17	7.58	Gulnare	1.81	12.76	13.34	19.74	
Hergott	0.58	2.21	4.16	6.04	BundaleerW.Wks.	2.54	12.67	11.36	17.29	
Farina Leigh's Creek	0.73	2.71	4.68	6·70 8·66	Yacka	1.83	9.92	10.72	15.27	
Beltana	0·81 0·66	$\frac{2.18}{3.63}$	$6.14 \\ 6.37$	9.22	Koolunga	1.75	9.36	11.31	15.94	
Blinman	1.25	5:55	9.20	12.85	Snowtown	3.13	12.24	11.30	15.70	
Hookina	1.55	7.62	9.20	12/00	Brinkworth	2.04	10.83	10.76	15.48	
Hawker	1.55	7.94	8.58	12.22	Blyth	2.41	11.68	11.53	16.34	
Wilson	1.10	6.68	8.31	11.78	Clare	3.85	17.64	17.17	24.30	
Gordon	0.86	4.95	7.06	10.26	Watervale	5.85	21.85	15.25	21.99	
Quorn	1.61	8.02	9.79	13:78	Auburn	5.45	20.68	19.25	27.17	
Port Augusta	0.97	5.28	6.45	9.46	Hoyleton	4.68	18.15	17.08	24.25	
Port Augusta W.	1.00	5-59	6.35	9.36	Balaklava	2.82 2.13	11.55	13.67	17.96	
Bruce	0.66	5.74	7.04	10-01	Port Wakefield	2.13	10.69	11.21	16.03	
Hammond	1.07	5.72	7.86	11.46	Terowie	1.34	7.09	9.61	13.13	
Wilmington	2.92	13.12	12-88	18.26	Yarcowie	1.48	8.11	10.12	1	
Willowie	1.25	7.38	8-10	11.90	Hallett	2.45	11.35	11.04	1	
Melrose	3.05	15.75	16.42	23.04	Mount Bryan	2.80	12.89	10.75	15.73	
Booleroo Centre	1.28	8.05	10.92	15.83	Burra	4.02	15.21	13.33	17.82	
Port Germein	1.94	9.48	8.93	12.84	Farrell's Flat	3.87		13.32		
Wirrabara	2.88	15.70	13.33	18.91	Toured Barbon 11.1	001	1 12 00	1002	1 10 01	
Appila	1.13	8.14	10.26	15.08	WEST OF	MURRA	y RANG	OE.		
Cradock	1.12	6.01	7.41	10.86					1.10.00	
Carrieton	1.90	7.97	7.90	12.22	Manoora	3.51	13.84	12.45		
Johnburg	1.23	5.15	6.33	10.21	Saddleworth	3.60	16.94 17.29	13.86		
Eurelia	1.63	8.46	9.13	13.24	Marrabel Riverton	4.22	18.42	14.36		
Orroroo	1.30	7.31	9.47	13.42	Tarlee	2.84	16.67	12.07		
Black Rock	0.99	6.72	8.47	12.25	Stockport	2.51	15.47	10.91		
Petersburg	1.20	7.72	8.80	13.07	Hamley Bridge	2.25	14.20	11.49		
Yongala	1.38	9.50	9.37	13.94	Kapunda	3.69	16.34	13.75		
,		27		į	Freeling	2.63	14.03	12.42		
	Nовтн-		_		Greenock	3.17	17.16	14.77		
Ucolta	1.33	5.81			Truro	3.55		13.78		
Nackara	0.83	6.99			Stockwell	3.40		14.01		
Yunta	0.38	2.85	5.49	8.22	Nuriootpa	3.18		14.81		
Waukaringa	0.61	3.68	5.46	7.94	Angaston	3.43		15.45		
Mannahill	0.53	2.68	5.71	8.46	Tanunda	2.53	16.76	15.65	22-28	
Cockburn	0.35	2.39	5.57	7.97	Lyndoch	2.42	17.73	16.40	23.01	
Broken Hill, NSW	0.97	5.01	6.71	9.63			•			
L	ower N	TORTH.			ADEI	LAIDE I	LAINS.			
Port Pirie	1.13		1 10-27	13.21	Mallala	2.26	12.01	111.90	16.88	
Port Broughton .	1.64	10.19	10.20	14.33	Roseworthy	2.29				
	2.56	11.24	11.24	15.42	Gawler	1.74	14.40	13.63	19-21	
Bute Laura	1.57	11.72	12.48	18.22	Two Wells	1.31				
Caltowie	1.44		11.57	17.27	Virginia	1.72				
Jamestown	2.10		11.71		Smithfield	1.42				
Gladstone	0.96		10.81		Salisbury	1.94	13.09	13.44		
Crystal Brook	1.10				North Adelaide	2.91	16.16	15.55		
Georgetown	1				Adelaide	2.53				
Narridy	1.40	1	10.69		Brighton	3.42				
Redhill	2.03				Glenelg	2.46	14.80	13-38	3 18-35	
	1	1	1	1	IV.	1 .	1			
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RAINFALL-continued.

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Station.	For Aug., 1915.	To end Aug., 1915	Av'ge, to end Aug.	Av'ge. Annual Raintall	Station.	For Aug., 1915.	To end Aug., 1915.	Av'ge, to end Aug.	Av'ge. Vnnual Raintall
ADELAIDE PLAINS—continued.					West of Spencer's Gulf-continued.				
Magill	3.53	119.87	19.79	25.69	Streaky Bay	5.12	1 12-60	1 11-91	15.31
Glen Osmond	3.66	21.28	18-41	25.20	Port Elliston	5.41	14-60		
Mitcham	4.08	20.98	17-19	23.47	Port Lincoln	3.51	15.32		19.88
Belair		12.74	21.14		Tumby	2.45	10.03		
				1 0.1	Carrow	2.43	10.79		m 27
MOUNT	LOwn	RANG	ES.		Cowell	2.15	11.48	,	11.76
				1 an 10	Point Lowly	1.38		,	12.21
Teatree Gully	3.33	20.45	20.38	28.19		1	1	1	1
Stirling West	8.01	41.26	34.34	46.70					
Uraidla	7.99	42.91	32.75	44.35	York	e's Pe	NINSUL	١.	
Clarendon	4.85	22.90	24.65	33-67	Wallaroo	1 6.20	1.10.00	1.10.94	1.14.00
Morpheit Vale	3.26	15.99	16.82	23-32	Kadina	2.56 2.88	10.69		14.05
Noarlunga	3.42	16.21	14-91	20.28	Moonta	3	12-17	11.73	15.88
Willunga	2.60	14-43	19.05	25.98	Green's Plains	2.24	11.64	11.27	15.22
Aldinga	3.34	13-91	14.91	20.34		3-01	12.55	11.65	15.73
Normanville	3.82	15-51	15.27	20.65	Maitland Ardrossan	3.58	17-17	14.77	20-08
Yankalilla	3-58	17.32	16.99	22.78	Port Victoria	2.32	11.28	10-10	13.89
Cape Jervis	2.22	8.30	12-39	16.34		2.36	12-43	11.23	15-20
Mount Pleasant .	5-11	21.86	19-28	26.87	Curramulka	3-00	15.72	13.55	18-51
Blumberg	4.98	22-18	21.37	29.38	Minlaton	3-19	16.47	12.95	17:41
Gumeracha	5.12	25.38	23.94	33.30	Stansbury	2.72	13-67	12.47	17.06
Lobethal	5.87	29.21	25.79	35.38	Warooka	3.40	13-50	13.33	17.71
Woodside	6.76	28.99	22.85	31.87	Yorketown	2.53	11.80	12.80	17.47
Hahndorf	6.80	25.56	25.45	35.45	Edithburgh	3.33	13.78	12-11	16.48
Nairne	5.06	22.72	20.58	28.83					
Mount Barker	5.96	25.80	22.17	30.93	Q	00	101		
Echunga	6.31	27.24	23.73	32.83	South A	ND DOE	THE RIAL	5 F.	
Macclesfield	5.23	23.78	21.76	30.72	Cape Borda	4.28	19-28	19.81	25.00
Meadows	6.87	32-16	25.43	35.52	Kingscote	4.08	13-80	14.35	18.95
Strathalbyn	3.12	14.07	13.74	19.28	Penneshaw	3.81	13-35	15.97	21-34
					Cape Willoughby.	3.80	15-43	14.40	19-69
Murray 1	FLATS .	and Va	LLEY.		Victor Harbor	3.67	13.20	16.08	22-18
Wellington	1.73	9-90	10.31	15.01	Port Elliot	2.63	10.70	14-63	20-33
Milang	2.16	8.98	11.62	16.08	Goolwa	2.65	11-71	12.88	17:93
Langhorne's Brdg	1.85	7-91	10.60	15.27	Pinnaroo	2:02	8.82	11.331	16-74
Tailem Bend	1.90	9.06	Burry		Parilla	2.13	8.76		
Murray Bridge	1.62	7.49	9-90	14.32	Lamerco	2.84	10:00	10.88	16:55
Callington	3.09	10.68	11.04	15.65	Parrakie	2.34	9.75		
Mannum	1.50	6-37	8.23	11.67	Geranium	2.26	10-10	1.15	17.16
Palmer	2.81	10.47	10.58	15.60	Peake	2.59	9-90	12.7	
Sedan	1.92	8.32	8.48	11.92	Cooke's Plains	2.53	10.76	10-18	14.74
Blanchetown	1.07	4.69	7.25	10.71	Meningie	2.92	9-35	13.53	18.87
Eudunda	4.00	14.14	12.09	17.33	Coonalpyn	3.51	10.58	12.21	17.49
Sutherlands	2.68	8.22	7.19	10.60	Tintinarra	3.26	11.61	13.09	18.78
Morgan	1.48	5.37	6.01	9.29	Keith	2.23	10.57		
Overland Corner .	2.17	4.75	7.37	11.42	Bordertown	2.51	11-69	13:30	19.76
Renmark	1:90	5.66	7.81	10.93 ·	Wolseley	3.14	12.98	11-97	17.72
Loxton	1.84	6.52		*******	Frances	2.90	13.00	13.76	20.74
		. '			Naracoorte	4.44	17.83	15.55	22.60
West of	Same.	mo'n A-	rr w		Penola	4.44	18.93	18.71	26.78
					Lucindale	4.31	17.22	16-66 [23.32
Eucla	0.83	6.83	7.60	10.13	Kingston	4.38	18-17	18-34	24.73
White Well	1.14	5.27	6.86	9.67	Robe	4.41	17.85	18.76	24.69
Fowler's Bay	4.82	11.35	9.54	12.11	Beachport	4.97	19.38	21.24	27.51
Penong	3.43	11.46	9.11	11.93	Millicent	6.37	24.49	21.73	29.25
Murat Bay	1.80	7.54		******	Mount Gambier .	5.35	25.17	22.58	32.00
Smoky Bay	2.48	8.85	-	**********	C. Nrthumberland	5.04	20.58	19.58	26.63
		100.	I	1		1		1	

THE AGRICULTURAL BUREAU.

CONFERENCE OF EYRE'S PENINSULA BRANCHES.

The fourth Annual Conference of the Eyre's Peninsula Branches of the Agricultural Bureau was held at Cowell on Tuesday, August 3rd, The Department was represented by Professor A. J. Perkins (Director of Agriculture), Messrs. D. F. Laurie (Poultry Expert), W. G. Auld (member of the Advisory Board), and George G. Nicholls (Secretary of the Advisory Board). The following gentlemen represented the undermentioned Branches of the Agricultural Bureau: Salt Creek-J. Abrook, A. Venning, M. Abrook, W. H. Gale, W. H. Stephens, H. J. Hill, George E. Barber, R. H. Hornhardt, T. C. Hornhardt, H. G. Hornhardt, W. Lee, jun., W. Lee, sen., J. Rivett; Yabmana—G. W. Story, J. F. Robertson, F. A. Beinke, M. K. Frost, H. P. McCallum; Miltalie-J. S. Story, W. E. Hier, J. O. Busch, W. G. Smith, P. G. Wilson, J. W. Story, H. Lienert, L. J. Aunger, E. Story, H. R. Jacobs; Mangalo-W. E. Waters, J. W. Deer, J. H. Cleave; Elbow Hill-F. T. Freeth, W. T. Cooper, S. V. Wake, A. O. Dawkins, A. O. Chilman, H. W. Wheeler; Roberts and Verran-J. C. McCallum, L. E. Cowley, W. C. McCallum, F. Masters. T. A. Wilson (Miltalie Branch) presided over the conference, and extended a welcome to the visitors.

Professor Perkins apologised for the absence of the Minister of Agriculture (Hon. C. Goode, M.P.), whose attendance was prevented by his participation in the recruiting campaign. The Professor referred to the difficulties under which the Department had had to work during the past 12 months. The additional duties which had been thrown upon the Department had to some extent hindered its normal operations. He emphasised the importance of the district from the point of view of its future prospects. What was known as the Western District of the State, consisting of Eyre's Peninsula and the country north of it, represented 60 per cent. of the total area of South Australia. Unfortunately, only about 35 per cent. of that area of 147,000,000 acres was occupied. The area under crop was about one-fifth of the total for the State. He was much impressed with the possibilities of the country. The problem of subduing the mallee shoots hindered to a great extent the rapid settlement of the Rolling and burning was a very cheap and quick method of clearing. The time taken, however, to thoroughly clear the land seemed, in many cases, to be unnecessarily long. No proper methods of farming could be adopted until the land had been thoroughly cleared, and the sooner the land could economically be cleared the sooner the occupiers would enter a period of real farming. Peninsula offered a great variety of soil and climate. The southern districts were suitable for fruitgrowing and dairying, and practically the whole of the peninsula could be adapted to wheatgrowing. general economic position of South Australia at the time demanded a considerable increase in the number of livestock. The introduction of livestock to a farm enabled the farmer to vary his practicethe growing of fodder and hav crops would be adopted, and pasture could be fitted in with the rotation. To allow of the keeping of livestock the farm would need to be improved in the direction of fencing, The most important boundary and sub-divisional, and water supply. factor in the success of farming pursuits on the peninsula was the early and thorough clearing of the land. He complimented those present on the favorable prospects for a splendid harvest, and declared the conference open.

CONSTRUCTION OF CEMENT TANKS.

Mr. W. Lee, jun. (Salt Creek Branch) read a paper on the "Construction of Cement Tanks." Generally, he said, a cement tank constituted the principal means of storage of water on the farm in this The cost of construction made it expedient for the farmer to do the work himself, as the greater part of the necessary material could be obtained on the farm; the essentials to be purchased being the cement, timber, and iron. He had constructed a tank of this nature, in sand, some time ago, and it had held water satisfactorily. In describing the procedure he followed, he said that after the excavating was completed, he made a heap of mortar with sharp screened sand four parts, and lime one part. The lime should be slackened in a box, with water, and screened through a half-inch netting seive. A 14in. wall, well built, would be found strong enough. The stone should be well bedded in the mortar, care being taken to break all joints; tie the corners well, and leave no hollows. walls should extend above the ground surface, to carry a sloping iron roof, the wall on the lower side being 3in. higher than the iron, in order that water falling on the roof should be diverted into the tank. The timber he used consisted of five 14ft. x 4in. x 2in. stringybark rafters, and five pieces 20ft. x 3in. x 2in. oregon across these and built in level. When dry, the joints of the walls should be raked out and brushed with a hard broom. For the floor, concrete of one part cement and six parts gravel, to a depth of 3in. or 4in.,

and well rammed when sufficiently dry, would be found best. The walls should then be roughed in with one part cement and four parts sand, and scratched over. On no account should the builder flush up with lime, as once the water got behind it the mortar would come A first coat of one part cement and three parts washed sand, mixed dry, should be trowelled on to a depth of about 4in.; a straight-edge should be drawn across it, and it should then be well A last coat of equal parts of cement and sand should then be put on as thinly as possible, and finished with a smooth surface. The floor could be finished with one coat of one to three, well trowelled off: the wall above the roof being coated over with one The iron was then put on, coming flush with the walls. The inside measurements of the tank he had constructed were 18ft. x 12ft. x 9ft., and $6\frac{1}{2}$ barrels cement, costing £4 17s. 6d.; timber, 19s. 5d.; 20 sheets iron, £2 15s.; nails, 2s.—a total of £8 15s. 1d.—constituted the material used.

In discussing the paper, Mr. A. Venning (Salt Creek Branch) said that for economy the round type of tank was to be preferred to any other.

Mr. D. F. Laurie (Poultry Expert) suggested the utilisation of odd pieces of fencing wire for the reinforcement of concrete in the construction of tanks or other work. Sand would be found an excellent foundation for structures of that nature.

CO-OPERATION.

Mr. F. Masters (Roberts and Verran Branch) read a paper on the subject of co-operation. Farmers needed to be educated in the need, the possibilities, and the advantages of co-operation, he said. There were many heavy drains on the profit of the producing community, such as agents, canvassers, middlemen charges, &c., which could be done away with by co-operative organisation. There was no reason why the farmers should not organise and import, buy and sell, manufacture and ship on their own behalf. The question was mainly one of finance. The strongest argument in favor of the principle was the success which had attended co-operative organisation in this State.

In the discussion which followed, Mr. H. R. Jacobs (Miltalie) said that he hoped steps would be taken to form some co-operative body. Mr. H. J. Hill (Salt Creek Branch) thought that existing institutions were able to meet all requirements. Mr. J. Abrook (Salt Creek Branch) said that some principle of co-operation should be outlined for the consideration of those interested. Mr. W. Lee, jun. (Salt Creek Branch) supported the movement for co-operative

effort, which had been successful in other branches of the producing industry. Mr. A. O. Dawkins (Elbow Hill) also favored the introduction of some co-operative system.

The Secretary of the Advistory Board of Agriculture (Mr. George G. Nicholls) made a suggestion that the idea of co-operation could be tested in a small way by individual branches, in order to ascertain exactly what advantages could be obtained.

Mr. F. Masters (Roberts and Verran Branch) opined that the measure of success which would attend any such movement depended on the farming community itself.

Messrs. Story (Yabmana Branch), Hier (Miltalie Branch), Wilson (Miltalie Branch), and Hill (Salt Creek) spoke in opposition to any co-operative movement in the Agricultural Bureau, and a motion was passed by the conference that it was opposed to co-operative effort on the lines suggested.

FREE PARLIAMENT.

Professor Perkins replied to a number of questions put to him by members of the audience.

Dairy Bulls.—He outlined the Government scheme for hiring out bulls, a scheme which was propounded with the idea of improving the quality of the dairy stock in the State. Stringent conditions had been laid down in regard to the manner of keeping the bulls, as previous experience had shown this to be necessary. The Government would not allow the male progeny of these bulls to be kept, as the object in view was to reduce the number of mongrel bulls in the country. Exception would be made, however, where the cows served were pure bred and of good type.

Potatoes: Excessive Top Growth.—Under normal conditions this would probably be caused by the presence in the soil of too much nitrogen in relation to the quantities of other elements.

White Mustard as Fodder Plant.—Mustard was frequently grown as a fodder, on account of the rapidity of its growth in the cold winter months. It would be found very useful to sow a quantity of mustard with rape. It could also well be sown alone as a fodder crop. Mustard could be sown in land fallowed in June or early in July; its winter growth was very rapid, and could be fed down before September, when the land could be cultivated and treated subsequently as ordinary fallow.

Red Rust.—Rust on the flag of the wheat plant was less dangerous than the form of rust which affected the stem of the wheat. It very rarely affected the leaf to such an extent as to interfere with the functions of the plant.

Black Rust or Flag Smut.—The term "black rust" was really a misnomer. The trouble was caused by a parasite. The sooty deposit escaped to the soil, and a crop sown on the same land in the succeeding year was liable to be affected. The disease was not very prevalent, and did not attack oats or barley. Variation of cropping should be resorted to, avoiding a repetition of wheat.

Superphosphate for Top Dressing.—Superphosphate should be drined in with the seed. If this was done its use as a top dressing was quite unnnecessary. In certain districts superphosphate was drilled in prior to seeding. This was a useful practice under certain circumstances. Its value was that it allowed the full strength of the farm being devoted to the broadcasting of the seed, thus enabling the maximum area to be sown during the most suitable period.

Experimental Work.—Experiments relating to the economics of the removal of stumps from the ground were best conducted by the farmer himself, as he was in the best position to decide to what extent the practice was profitable. Immediate grubbing and clearing of land might prove too expensive in many cases, but it should be the aim of the rarmer to have his land cleared as soon as possible. Little importance could be attached to experiments conducted in uncleared land. The officers of the Department would be pleased to conduct experimental work on private farms to a limited extent. In such cases, an inspection of the proposed land by an officer would be necessary.

Cuttivation of White Sand.—It was very doubtful if it were worth white, in present circumstances, trying to cultivate pure sand of any description. Pasture could be tried, but unless the sand was well covered, drift was liable to recur after feeding. Evening primrose was often used. Rhodes grass also was a hardy grass, and with favorable summer conditions would produce good feed.

RESOLUTIONS.

Wharfage Rates.—On the motion of Mr. L. Aunger (Miltalie Branch), a resolution was passed by the conference that the Advisory Board of Agriculture should use its influence to secure a reduction in the wharfage rates charged for small parcels of skins and produce.

Rabbit Pest.—After considerable discussion, a resolution was passed, on the motion of Mr. F. Masters (Roberts and Verran), seconded by Mr. H. R. Jacobs (Miltalie Branch), that each Branch represented should form itself into a committee to act, in conjunction with the Vermin Board, for the speedy extermination of the rabbit pest, each Branch to make a report on the matter to the general secretary.

FARM FRUIT GARDENS.

Mr. F. T. Freeth (Secretary Elbow Hill Branch) read a paper on this subject. He advised every farmer to have a fruit and vegetable garden. The site selected should be dressd with well-rotted stable manure, which should be deeply ploughed in with the aid of a single-furrow plough. If possible, a subsoiler should be used, as it was essential that the land should be thoroughly broken up. Holes for fruit trees, which should be 3ft. across and 2ft. deep and 30ft. apart, should remain open for awhile, and then be filled to within 9in. of the top with prepared soil. When planting, care should be taken to cut off any broken roots. The remaining roots should be well spread out, in a downward direction, from the centre. A stake should be placed on each side of the tree, which should be attached thereto by means of a fastening that would not cut or bruise the bark.

Success in vegetable culture could only be attained by destroying the growth of weeds, and preventing the ground setting down hard. The Dutch hoe would be found very useful in this connection. Care should be taken not to plant vegetables too closely together. A successful way of combating the slug pest was to place a cabbage leaf over a small hole in the ground; the slugs would seek shelter under the leaf, and thus be trapped. He advised the provision of a breakwind by planting carob trees, and, inside these, almonds, around the garden.

- Mr. W. G. Smith (Miltalie Branch) said that in his experience apples had not proved to be very successful. Plums also did not do very well, but other stone fruits could be profitably grown.
- Mr. J. P. Story (Miltalie) recommended the use of the drill for sowing vegetable seeds.
- Mr. E. Story (Miltalie) referred to the need for breakwinds for protection of fruit and vegetable gardens.

Professor Perkins said that very little work was needed to grow a few fruit trees and vegetables. Breakwinds were essential on a farm, not only for the protection of the orchard, but also to provide shelter for stock. For this purpose Aleppo pines, Stone pines, Canary Island pines, and cypresses were to be recommended, also the Carob tree, the beans of which had value as a food for stock. Olive trees, if not planted too closely, would grow well, and prove of considerable value in time to come.

SEED WHEAT.

Mr. H. P. McCallum (Yabmana Branch) gave a short address on this subject. He said he had had experience with King's Early, Gluyas, King's White, King's Red, Marshall's Hybrid, Federation, Silver King, and Early Viking varieties. Gluyas needed to be sown early, as also did King's Early, which was liable to rust if sown late. He considered that too little attention was paid to the preparation of seed wheat. Wheat was often sown which could more profitably be fed to pigs or poultry. A good crop could not be expected from inferior seed. For pickling he recommended a solution of bluestone, 1lb. dissolved in 10galls. of water. A safe method was to dip a partly filled bag of seed in the pickle. Every care should be taken that the wheat grains were thoroughly wetted.

Professor Perkins recommended pickling on a floor, or the use of a proper pickling machine. The practice of dipping the seed allowed of the formation of air bubbles around the grains, which prevented effective treatment. Proper turning or stirring was essential in order that the process should be successful. The use of graded seed was to be strongly recommended.

NEXT CONFERENCE.

On the motion of Mr. J. Abrook (Salt Creek Branch), seconded by Mr. F. Masters (Roberts and Verran), a resolution was carried that the next conference should be held at Cleve. The Roberts and Verran Branch was invited to make the necessary arrangements.

Mr. W. G. Auld (member of the Advisory Board) expressed his pleasure at being present. His inspection of the surrounding country had very favorably impressed him. He mentioned the possibilities of the country for the growing of olives, which, besides providing shelters and breakwinds, could be turned to profitable account for the manufacture of oil.

POULTRY.

Mr. D. F. Laurie (Government Poultry Expert) gave an address on poultry matters. He said that Eyre's Peninsula was equal to any part of the State for poultry. There was no difficulty in finding markets for eggs and poultry, as any surplus over local requirements could be profitably disposed of in Europe. The farmer could keep a good class of fowls just as cheaply as the common kinds, and he would find that the returns were much better. He considered an average gross profit of 9s. per hen per annum could be made. On Eyre's Peninsula egg-production should be the chief aim, and for this purpose the South Australian White Leghorn had no equal. A

fox-proof enclosure for the fowls was the first essential. would then be under proper control, and no loss through laying away would be experienced. A breeding pen should be provided, and the best fowls should be selected from which to breed. Laying hens should not have a cockerel running with them. Infertile eggs only Surplus cockerels should be marketed as should be sent to market. soon as they were a suitable size. Autumn hatching would be found very successful; breeding could be continued until September, and good birds would be produced. Farmers who were re-stocking their poultry yards should take the opportunity of securing purebred birds. Green feed was an important factor in the successful feeding of poultry. The feeding of a large proportion of green stuff was economical, and the fowls were healthier and more productive. Lucerne hay was one of the best green fodders. He described the functions of the organs in the production and fertilisation of eggs. Diseases should not occur in well-regulated yards. Nearly all troubles could be traced to errors in feeding or housing. The feeding of smutty and inferior grain should be avoided. Poultry tick was the cause of much illness. This parasite carried an organism which caused blood poisoning, and the condition known as "tick fever." Houses should be built of iron, a material which would : "Chicken pox" caused eye trouble offer no harbor for the tick. amongst fowls. The treatment consisted of bathing affected parts with a wash composed of equal parts of vinegar and water, and after drying a 5 per cent. mixture of carbolised glycerine should be applied to the sores. Diphtheria was caused by a micro-or-The lumps under the eyes which resulted should be cut, and the matter removed. It was a highly infectious disease, and the best means of combating it was to kill affected birds and burn Epsom salts were a first-class adjunct to feeding. packet should be put in the drinking water for every 20 fowls. laying hens glauber salts were preferable. This would cause the removal of most internal parasites, such as worms. A dust bath should be provided for the fowls, to enable them to rid themselves of external parasites, such as lice, &c.

The treatment for scaly leg, which was also caused by a parasite, consisted of scrubbing the legs with warm water and yellow soap, and afterwards applying a mixture of equal parts of kerosine and oil. Some method of identification, such as toe punching, should be adopted. The most profitable period of the hen was the first 12 months after she came into laying. The best fowls could be kept an extra six or eight months.

In replying to a number of questions, Mr. Laurie recommended the feeding of grain in scratching material; 1½oz. to 2oz. of mash per fowl should be supplied for the morning feed, and 1oz. of wheat in the evening. For a drinking vessel, a kerosine tin with a hole cut in either side was the best.

EXTENSION OF AGRICULTURAL BUREAU WORK.

Mr. George G. Nicholls (Secretary of the Advisory Board of Agriculture) gave a short address on this subject. He said the extension of the Bureau in recent years had been very satisfactory, and Evre's Peninsula had participated in the general progress made. direction in which the work of the Bureau could be improved was the organisation of the individual Branches. The mapping out of a programme of work was essential to the best results. could be set apart for the purpose of making a general tour of inspection of the farms in the district, and the condition of the crops and other matters could be discussed with mutual advantage. was plenty of scope for demonstration and experimental work, testing of varieties of wheat, quantities of fertilisers, &c. Competitive tests should also have attention. Competition in wheat growing, general farm management, could be made interesting and ad-Such matters as the condition of teams, attractiveness of homesteads, clearing of land, &c., could be made the subjects of similar competitions. The Bureau could well take upon itself the duties of a vigilance committee, to report and make inquiries regarding matters of import to the district. Necessary rules should be laid down for the conduct of the Branch, and they should he properly carried out. Committees should be appointed to deal with various branches of work, and officers should be required to render efficient service. The great aim should be to endeavor to translate talk into action.

Votes of thanks to the Chairman and Secretary of the conference and officers of the Department were earried by acclamation, and the proceedings were brought to a close by the singing of the National Anthem.

EXHIBITS.

A number of exhibits were on view in the hall. Fine samples of wheat of different varieties, some of which were 5ft. in height, were displayed. Good samples of barley, mustard, lettuces, beet, cabbages, peas, and carrots were to be seen, and also some magnificent turnips, which testified to the capabilities of the district in the direction of vegetable growing.

AGRICULTURAL BUREAU REPORTS.

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^{*}No report received during the month of August. + Formal report only received.

‡ Held over until next month.



Dates of Meetings—
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THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by H. J. Finnis.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall, 11in. to 12in.).

July 27th.—Present: 19 members and two visitors. Care of Harness .- A paper on this subject was contributed by Mr. II. A. Toop, as follows:—"With new harness the first thing to be done is to thoroughly saturate it with good neatsfoot oil. Some prefer fat and resin, but I consider neatsfoot oil better, as it goes more into the leather, and preserves it against dampness for a longer period. Harness that has become hard and cracked, when exposed to the wet, takes in a great amount of water. When this dries it is harder than ever. If leather is kept oiled at least twice a year, it keeps nice and pliable. It is a matter of importance to keep all stitching in repair. This can be done by almost anyone. All that is required is a few needles of various sizes, awls, wax, and a ball of hemp, and if one intends to go in for collar lining collar needles and a palm will be needed. The main factor to be observed in stitching is to have the two pieces to be sewn kept firmly in position; if no other way is practicable, they can be held in vice, but it is much handier to have a proper clamp. should always be done with two needles, and both needles should be pulled through at once to prevent one wearing the thread of the other. Before commencing to sew make up several lengths of wax ends of the size required; about four strands of hemp is enough for ordinary use. The hemp should be waxed before it is twisted, then twisted to the right as tightly as possible. About 6in, at each end should be then twisted in the opposite way, and the needle put on; then twist it to the right again, and the needle is firmly fixed. A little bit of candle rubbed on the thread will keep it from sticking to the hands, and make it run easily. Lining collars is somewhat more difficult, but when one does it oneself the collar can be made to fit the horse. In cutting out check for a collar it is always better to make a brown paper pattern first and fit it on the collar, then cut the check just the size required. Prepared hair can be bought for very little more than the price of tail hair. good will be served by just putting back the hair that was in the collar before, as it takes a lot of cleaning, and only the coarsest can be put back again. Great care should be observed in putting the hair in, not to have any lumps to injure the horse's shoulder. If possible harness should always be kept in a small shed, with an iron roof, by itself. The general practice of keeping it in the stable is not a good one. It should always be hung up, especially collars; a piece of 1½in. piping is a good thing on which to hang them. Nothing knocks more out of harness than letting horses feed with it hanging loose on them, and the horses do not like to be loaded up with harness while they are feeding. Every time a collar is used the padding should be well brushed to remove all dry sweat. This will do a great deal to prevent sore shoulders. I do not agree with the system of soaking a new collar in water before putting it on; this does more harm than good. If one gets a collar to fit anywhere near, it will conform itself to the shape of the horse's shoulder before any harm is done. There is no reason whatever why a set of harness should not last a very long time. With the ever increasing price of leather, any kind of harness is becoming very expensive. This is all the more reason why it should be looked after while it is good.'' In discussing the paper, Mr. W. Toop said hair for collar lining should be soaked and twisted, placed in an oven until quite dry, and then chopped into short lengths. Mr. G. Collins recommended the use of a mixture of neatsfoot oil and mutton fat as a waterproof dressing. Mr. H. A. Toop advised cleaning old collar hair by drawing it between boards from which wire nails protruded about one inch.

ORROROO (Average annual rainfall, 13.42in.).

July 24th.—Present: 17 members.

GARDENING AS A HOBBY.—In a paper with this title Mr. J. C. Hagger said there was no reason why gardening, whilst carried on as a hobby, should not be profit-Where the ground had not been previously ploughed, holes for fruit trees should be made about 2ft. deep and 3ft. square, and the trees should be planted at the same depth as they were in the nursery. Trees with strong, healthy wood should be selected, and with plenty of buds. The main arms, which should be about three in number, should be cut back fairly short. Sharp secateurs should be used, so that the wounds would heal quickly. The weaker the shoot the shorter should it be cut, so that the available energy should be devoted to a less number In the following year, the growths from the main arms should be cut back to form secondary arms, which produced leading shoots for wood for the succeeding year's fruiting. The object was to shape the tree with a short, stout stem, with short main arms evenly spaced, and open in the centre to allow sunlight and air access to the tree. It was necessary to spray apple and pear trees at least four times at intervals of about six weeks. When planting it was wise to put the The following varieties were redifferent varieties in separate rows or blocks. The following varieties were recommended:—Apples, Jonathan, Rome Beauty, Cleopatra; Pears, Williams' Bon Chretien (Duchess); Peaches, Brigg's Red May, Royal George, High's Early Canada; Grapes, Muscatel, Raisin de Dame, Red Prince. The matter of breakwind and shelter was important, and almond trees or hedge plants should be planted to provide this.

QUORN (Average annual rainfall, 13.78in.).

August 24th.—Present: six members.

Annual Mreting.—The Hon. Secretary (Mr. C. Patten) read the annual report on the operations of the Branch during the past year. Six meetings had been held, with an average attendance of six members at each, and in view of the drought conditions which had prevailed, this was considered very satisfactory.

Horses' Terth.-Mr. Jago read a short paper, explaining the relation between

the age of horses and the condition of their teeth.

WEPOWIE (Average annual rainfall, 13in. to 14in.).

July 27th.—Present: 16 members and four visitors.

RECLAIMED MURRAY SWAMPS.—In a short paper Mr. E. J. Pearce described the method of draining and channelling the reclaimed areas on the River Murray. The reclaimed swamp land, he said, was best worked with a disc cultivator plough. With constant working it was possible to secure a splendid seed bed, and the rapidity of the growth of vegetation was most noticeable. Millet, lucerne, maize, and sorghum grew very well. He expressed the opinion that the reclaimed land, under proper management, would be very productive.

WIRRABARA (Average annual rainfall, 18.91in.).

July 24th.—Present: 25 members.

CULTIVATORS AND SKIM PLOUGHS.—In a paper on this subject, Mr. E. Hollitt said the cultivator should never be allowed to become loose in the jumpers. The farmer should select an implement that had the share well up under the jumper, so that when it jumped, it did not lift out of the ground so quickly as was the case if

it went straight down from the back of the jumper. As a general rule triangular implements ridged the ground, and soon caused it to become uneven. The double V implement was usually regarded as the best. The cultivator should have three levers, one for the purpose of letting the front into the ground, and the other two to act on the back of the implement. The draught should be from underneath. A top draught implement did not, as a rule, jump free. When a spring was attached to each tine, one or two could be lifted without interfering with the draught. The writer was of the opinion that a round or oval shaped share was preferable to the ordinary flat, triangular share, and that a skim plough was generally preferable to the cultivator. A good discussion resulted.

CARRIETON, July 22nd.—An instructive discussion dealing with the practice of deep or shallow ploughing took place. Members generally agreed that in a shallow soil with a rubble subsoil shallow cultivation was advisable; when the soil was deep or hard deep cultivation was best.

HOOKINA, July 27th.—Annual Meeting.—The Hon. Secretary (Mr. S. Stone) presented the annual report of the Branch. The activity of the Branch had been somewhat suppressed by the prolonged drought, but with the brighter prospects existing, more active work was expected in the future.

WEPOWIE.—Co-operation.—Mr. R. Halliday introduced this subject in a paper, and discussion followed.

YONGALA VALE, July 24th.—Mr. Jamieson addressed members on the necessity for care and economy on the farm. He strongly deprecated the practice of keeping unremunerative stock on the place. Mr. Fowler read a short paper.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BOOLEROO CENTRE (Average annual rainfall, 15.83in.).

August 13th.—Present: 16 members.

Mr. A. Schmitz read a paper entitled "The best class of stallion for the district." He emphasised the importance of having a good stallion for the breeding of farm horses. Heavy draught horses were to be preferred to the medium type on the grounds of economy. He recommended the Clydesdale stallion for their district. They were active horses, strong, and good tempered. In the selection of a sire certain characteristics should be taken into consideration—soundness, temper, action, breadth of chest, shapeliness of body, and size of hoofs. Every farmer should breed foals for his farm requirements. If suitable mares were not available on the farm the farmer should secure good mares for breeding purposes. In discussing the paper Mr. Carey, sen., favoured medium draught horses. Mr. Whibley believed in breeding from the best horse and mare, culling out the poor class of horses, and gradually improving the standard of horses on the farm. Mr. Michael also offered criticism.

CANOWIE BELT (Average annual rainfall, 20.04in.).
July 21st.—Present: 18 members and four visitors.

Mr. Jenkins, of the Whyte-Yarcowie Branch, delivered an interesting address dealing with the subject of improving the stock-carrying capacity of farms. The high prices ruling for stock made it profitable to hand feed at certain seasons; and also to use the binder and thresher. The latter could be owned and worked cooperatively. He favored the three years of farming for these districts.

CRYSTAL BROOK (Average annual rainfall, 15.62in.).

July 24th.—Present: 21 members.

Wheats for the District.—A paper dealing with this subject was read by Mr. G. Gum. He laid emphasis on the need for farmers to study the requirements of their particular holdings, as even in one small district there might be great variations of soil conditions. To successfully grow wheat he must work his land for 12 months. As to the best wheats for this district, he said—"Gluyas as an early wheat stands out as one of the most reliable for all seasons. I believe on heavy soils it goes down badly, but in sandy soil it stands up fairly well. It needs to be sown a little thicker than most wheats, as it does not stool well. Some advocate feeding off early wheats to cause them to stool, but my experience is that if a dry spell follows, this has the opposite effect. I would rather feed off late wheat. If Gluyas is to be fed off it should be done early in the season. It is a good wheat to sow late in the season. Carmichael's is a wheat which has a great name in this district, but I am afraid it does not suit our country nearer Huddlestone. The wheat that has always come out best with me is Marshall's No. 3. This suits our end of the district best. I advise sowing as early as possible, on good clean ground. Every farmer should have his own experimental plots, and so find out for himself which wheats will pay him best."

LEIGHTON (Average annual rainfall, 16in. to 17in.). August 19th.—Present: 17 members and two visitors.

Handling and Breaking of Saddle Horses.—Mr. J. J. Wardle read a paper on this subject. He said that, after catching a colt, it should be tied up securely with a good rope, so that it could not possibly escape, otherwise it would learn the bad habit of trying to break away. The colt should then be approached and treated very gently so that it should not become afraid of being handled. If necessary hobbles could be employed. The saddle could afterwards be put on, and with a long pair of reins, the colt should be driven around and taught to stop and to turn. It could afterwards be taught to become accustomed to the action of mounting, and could then be ridden for a short distance, not more than four or five miles for the first time. It should be ridden a few miles every day for the first week, and the more often the rider mounted and dismounted the sooner would the colt become thoroughly quiet. In discussing the paper, members agreed that kindness was essential to success in the breaking of a colt.

BEAUFORT, July 22nd.—Annual Meeting.—The election of officers took place and the annual report was read by the Hon. Secretary (Mr. W. B. Sampson). Thirteen meetings had been held during the period under review, and the average attendance of members was eight. A number of interesting papers had been contributed by members, and had provoked healthy criticisms and discussions. The Hon. Secretary drew attention to the value of experimental work which could be carried out by the branch.

BOOLEROO CENTRE.—Co-operation.—This subject was discussed by members, who were of the opinion that the principle was of considerable interest to the man on the land.

DEMONSTRATION PLOTS.—Mr. Wibley reported having sown different varieties of wheat in plots of equal size; these he intended to bind and head separately.

GLADSTONE, July 26th.—Annual Meeting.—The Hon. Secretary (Mr. E. P. Rowe), read the annual report on the operations of the Branch during the previous year, and after the election of officers and other business had been dealt with, a social evening was spent. Mr. W. H. Wood (Inspector of Stock) read a paper on 'Parasites Affecting Sheep.'

LEIGHTON, July 22nd.—The Hon. Secretary (Mr. W. H. Lloyd) presented the annual report of the Branch, which showed that effective work had been done during the term under notice.

MOUNT BRYAN, July 30th.—Annual Meeting.—The annual election of officers took place, and the President (Mr. A. A. Jefferies) contributed a paper, which was succeeded by a lengthy discussion.

MUNDOORA, July 26th.—Members read and discussed the paper contributed by Messrs. Nolan and Knappstein on "Co-operation." Whilst generally the principle was approved, members did not favor any action by the Agricultural Bureau in this direction.

NARRIDY, July 31st.—Mr. H. E. Threadgold read a paper from the *Journal* relating to varieties of cereals for hay. The Hon. Secretary, Mr. J. Dailey, was opposed to drilling oats with wheat, as the former required to be fairly ripe before cutting. Mr. Satchell also was averse to sowing a mixture of oats and wheat. He favoured varieties of wheat such as King's Early, King's Red, and Gluyas.

REDHILL, June 25th.—The Hon. Secretary read the annual report of the Branch's work. A resolution was passed to the effect that good would result if show judges followed a practice of discussing the merits of exhibits with exhibitors after the awards had been made.

REDHILL, July 27th.—BLIGHT ON VEGETABLES.—In reply to a question, Mr. R. Lister recommended tobacco wash for the treatment of vegetables affected with blight. Some discussion also took place in regard to the improvement of homestead surroundings, and the extension of Bureau membership.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

BALAKLAVA (Average annual rainfall, 16.03in.).

July 10th.—Present: 11 members.

LUCERNE.—A paper on this subject was read by Mr. Thomas. In discussing the subject, Mr. Uppill did not think there was a great future for lucerne growing in the Balaklava district, although it might be done for dairying purposes, the cost of water was against it. Mr. Reid tried lucerne growing for some years, and his experience was that it would not do without plenty of water. Mr. Twartz agreed with Mr. Reid. It was not profitable to irrigate lucerne in this district if the water had to be paid for. Mr. Goldney said under ordinary conditions lucerne would not be a payable proposition in this district. Mr. Fisher had had success with a small patch. He would not have been without it during the past year. Mr. Tuck agreed with Mr. Fisher. He thought a little lucerne should become one of the ordinary productions of a farm. They could not estimate the value of a little green stuff for stock during the dry weather. Mr. Spillane said in years like last season lucerne would be useful, especially if sown in the stubble. The Chairman said, although lucerne seemed costly to grow, they had not realised the full value of it.

CLARE, July 23rd.—Annual Meeting.—The Hon. Secretary (Mr. P. H. Knappstein) presented the annual report of the Branch for the preceding 12 months. Eleven meetings had been held, at which the average of members was 18. The fourth annual pruning match conducted by the Branch had been successfully held on June 7th. The election of officers for the ensuing year afterwards took place.

JULIA, July 31st.—Annual Meeting.—The Hon. Secretary (Mr. W. H. Neal) presented the annual report on the operations of the Branch during the year, and officers were elected for the coming 12 months. Mr. W. Gehling exhibited a model of a patent header, which could be attached to an ordinary harvester. The method of working was explained, and it was stated that the approximate cost of the appliance would be £12 10s.

NANTAWARRA, July 22nd.—Annual Meeting.—The Hon. Secretary (Mr. G. L. Tucker) presented the annual report on the operations of the Branch during the previous 12 months. The average attendance of members at meetings was nine.

STOCKPORT, July 23rd.—Annual Meeting.—The Hon. Secretary (Mr. J. Murray) presented the annual report on the proceedings of the Branch during the preceding 12 months. The average attendance of members per meeting was five. The annual election of officers also took place.

TWO WELLS, July 27th.—The occasion of the annual meeting was spent by inspecting the farm and homestead of the Hon. Secretary (Mr. H. W. Kenner), and Chairman (Mr. W. S. Cordon). The Hon. Secretary's report showed that during the year nine meetings had been held, with an average attendance of 10 members.

YORKE PENINSULA DISTRICT. (TO BUTE.)

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MAITLAND (Average rainfall, 20.08in.).

August 7th.—Present: 12 members.

Farm Horses.—In a paper on this subject Mr. O. W. Jones said that for farm work the pure-bred draught horse could not be surpassed. The medium draught, however, was a very useful animal on the farm, and had the advantage of being cheaper to buy and cheaper to feed. If a farmer intended to breed horses, and had a number of mares available for breeding, he should select only the best for the purpose. It was unprofitable to breed from poor stock. For heavy draught horses, the Clydesdale was the best, but for a lighter type of horse the Shire would meet requirements. Great care should also be taken in the selection of a sire. A good, sound, and active stallion with a good pedigree should be insisted upon. The aim of the breeder should always be to endeavour to improve the standard of his stock. Mr. Bawden referred to influence which the temperament of a sire or mare had on its progeny. Messes. Cornish, Smith, Bentley, Tossell, and Jarrett also spoke. Varied opinious were expressed in regard to the type of horse most useful for farm work.

MOONTA (Average annual rainfall, 15.22in.). August 24th.—Present: 19 members and one visitor.

FALLOWING.—Mr. Kitto read a paper on this subject. He said that all land should be ploughed to a depth of 4in., and in some cases deeper. The operation should be carried out as soon as circumstances permitted, and the land was in a fit

condition for ploughing. When rain fell on cultivated land it settled it down, and a capillary action was set up which resulted in the rapid evaporation of the moisture. To avoid this, periodical cultivation was necessary, and should be carried out as soon as possible after falls of rain. For this purpose the harrow was the best implement; on some classes of land more vigorous cultivation would be required, and a spring tooth cultivator would be very suitable. Fallowing not only assisted in the conservation of soil moisture, but also allowed of the aeration of the soil, and destroyed the weeds. Sheep could, with advantage, be kept to assist in the destruction of the weeds. Thorough fallowing ensured that the land was ready for seeding when required; it was work which could mostly be done at slack periods of the year. It was not possible to lay down hard and fast rules for fallowing. Farmers had to be guided by weather and other conditions.

PINE FOREST (Average annual rainfall, 14.15in.).

July 20th.—Present: 10 members and a number of visitors.

The annual meeting of the Branch was held at the residence of Mr. R. Barr, jun. The meeting was addressed by the Assistant Secretary to the Advisory Board (Mr.

H. J. Finnis), on the subject of Bureau organisation and management.

SPARROW DESTRUCTION.—In a paper on this subject, Mr. A. Hewett said the best time of the year at which to attempt the destruction of sparrows was during July and August. He advised placing a small quantity of poisoned wheat inside a small wire-netted structure, inside the fowls' run, and feeding the fowls at the time when the poisoned wheat was laid. The poisoned wheat should only be put down on alternate days. The dead birds should be buried.

Social.—In the evening, after members had partaken of dinner at the board of Mr. Barr, a social gathering was held, at which musical and elecutionary items were rendered. The Hon. Secretary (Mr. R. D. Goodridge) read the annual report, and an address on co-operation was delivered by Mr. H. J. Finnis.

YORKETOWN (Average annual rainfall, 17.47in.).

July 10th.—Present: 10 members.

HARNESS.—A short paper dealing with the subject of the treatment of harness on the farm was read by Mr. E. Warren:-- 'One of many items of importance on the farm is that of selecting and caring for harness. Any kind of harness, regardless of size or shape, will not do to work on a horse that has heavy pulling to do. Every horse should have its own harness, and the harness should be so made that it fits the horse with comfort. Winkers, collar, and saddle should all go on with ease, but not Half the sore shoulders on horses are caused, not by work, but by a be too big. collar that does not fit. The collar should go back on the horse's shoulder without pinching the neek, and at the same time be not too long. This will cause a lump to form on the point or lower part of the shoulder. For ordinary farm work about an inch of space between the horse's neck and the collar is sufficient. The pipe collar is the best on most horses, as it allows room for breathing, and will save the horse from choking down. If the collar causes a sore on the shoulder, do not throw it aside. Probably the next one you put on will do the same. Make it fit This may be done by taking a round headed hammer or mallet and the shoulder. beating the collar on the spot where it has caused the sore; this will case the pressure on that particular spot. If this is not sufficient, take a pocketknife, make a small hole near the edge of the lining opposite the spot, and with a small wire hook remove a little of the stuffing. The hole may be sewn up again to prevent It is impossible to make the shoulder fit the collar, but in this the lining fraying. way you can make the collar fit the shoulder. All harness should be kept under cover when not in use. Exposure to the sun or rain will soon cause it to become Some prefer having a room in which to put the harness. rotten and worthless. While this is perhaps a good and safe plan, it is not so convenient as having hooks or pegs in the stall, where each horse's lot can be hung ready for use. should be well oiled at least three or four times a year; mutton fat mixed with oil, made warm, and rubbed well in, is a good mixture to keep out the wet and soften the leather. It should be kept in repair. Keep needles, a ball of hemp, and some wax or a box of bifurcated rivets on hand. These can be quickly put in, make a neat and safe job, and will keep the harness together until it can be taken to the saddler for repair. This is much better than cutting holes in the leather and tying knots in it. Perhaps the chains and swingle trees secure least attention from most farmers. Care should be taken to see that the chains of each pair are the same length. Swingle trees should be long enough to prevent the chains rubbing the horse's sides. The main swing should be sufficiently long to allow the horses The length, of course, depends upon the number of horses." to pull straight. In discussing the paper the opinion was expressed that it was unwise to hang harness in the stables, as ammonia given off by the manure tended to rot the leather. An innovation in the shape of a notice board with columns for "wanted to buy" and "wanted to sell" was introduced.

WESTERN DISTRICT.

GOODE (Average annual rainfall, 12in. to 13in.).

July 21st.—Present: 17 members.

FARM CRITICISM .- Mr. W. Folland contributed a paper on this subject. He said that criticism of different farm methods tended to produce an improvement in management. Farmers should give proper consideration to the purchase of implements or machinery, and be quite sure that a contemplated purchase would meet their requirements. All machinery should be kept in a good state of repair, and The farmer should select horses that could receive a coat of paint occasionally. be used for more than one class of work, so that the greatest economy could be effected in feeding. Breeding of horses should also be carried on, as older horses could, with advantage, be replaced from time to time. Horses should be well housed, and sufficient quantities of fodder should be reserved each year. ing required to be done very thoroughly if the best results were to be obtained. Continuous cropping should be avoided; the practice of leaving the land out to pasture occasionally was a very good one. Fencing was another important matter. The expense of putting up good, strong fences would always be warranted by the security which they ensured. Mr. Tainsh, in a paper on the same subject, also referred to the necessity for good fences. The new settler often found it necessary to erect 'lightning' fences, and they served very well in the early periods of farming. They should, however, be replaced by good fencing at the earliest opportunity. Good, substantial sheds and stables also should be erected as soon as circumstances would allow. For storing wheat the floor of the shed should be 21ft. from the ground. Some farmers used brush for roofing water tanks, but this was not economical. Galvanized iron was best to provide a per-Some discussion took place, and opinions differed in regard to manent roof. the distance at which fencing posts should be placed apart from one another.

CO-OPERATION.—Mr. W. Folland also read a paper on this subject. He emphasized the advantages which were to be obtained from co-operation, and outlined several principles which might be adopted in initiating such a movement. though that a co-operation of Agricultural Bureaux would reap considerable benefits

as a result of the competition for the trade which it could offer.

MOUNT HOPE.

August 6th.—Present: 11 members and one visitor. Wheat-growing.—Mr. J. Colbert read a paper on this subject. He said that land for wheat-growing should be kept as clear as possible of weeds. When seed was sown in dry land it should be harrowed as soon as rain fell. If an early sown crop became dirty it was well to cut the worst patches for hay. Good stubble burns aided considerably in the subjection of the mallee shoots. Practice had to be varied according to circumstances, but he favored harrowing after the drill. For land that had been cropped more than once he recommended sowing 60lbs, of seed to the acre, with a dressing of 60lbs, of super, per acre. If it were necessary to sow the seed dry, it should be shallow drilled, as malting would then be less likely to occur. For hay the sowing should be done carly; for grain it could be left until later. In discussing the paper, Mr. W. Mahoney said that 45lbs, of seed to the acre was ample. Mr. Walker did not favor fallowing on their coastal country owing to the liability of the land to drift. Mr. R. Myers

also criticised the paper.

Care of Sheep. In a paper on this subject Mr. G. A. Vigar said that the first essential to the keeping of sheep was good fencing. Suitable paddocks, with a good supply of water, should be available to provide changes of pasture. ing should be conducted so that lambing would take place from the middle of April to the middle of June. Not more than fifty ewes should be mated with one ram, and they should not be allowed to become too fat during the period of gestation. About a month before lambing the ewes should be crutched and their eyes should also have attention. The ewes and young lambs should, if possible, be put on to good green feed, and ample food should be available in order to promote a good flow of milk for the benefit of the lamb. The lambs could be marked when from three to five weeks old. Shearing should be done in the spring, but it should be left as late as possible, provided grass seeds were not troublesome. At shearing time, when there was an opportunity to examine the sheep, all poor animals should be culled out. The raising of fat lambs was a very profitable undertaking. For this purpose the Merino ewe was to be recommended, mated with a ram of the Shropshire, Lincoln, Dorset, or Leicester breeds. In the discussion which followed Mr. A. Stigemann emphasised the necessity for dipping sheep. Messrs. E. Hillier, R. Myers, and H. W. Myers also offered criticisms.

YABMANA (Average annual rainfall, 15.14in.). July 29th.—Present: six members and four visitors.

FARM MANAGEMENT.—Mr. W. Dorey read a paper on this subject. He said that it was unwise to build the barn and stables close together; the haystacks also should be located at a safe distance from the stables and other buildings. Wherever possible, the implement shed should be provided with an iron roof. In hilly country, springs were to be preferred to bridles for ploughs, as the latter allowed the plough to leave the ground when coming down hill. Where the ground was clear, the hoe drill was to be favored. Where farming was carried out on a fairly large scale the stripper and winnower were preferable to the harvester. If a motor winnower were used, the motor should be detachable, so that it could be used for other purposes, such as chaffcutting, crushing corn, &c. It was a good plan to cut a proportion of straw, to be used when feed was scarce. Lucerne growing might possibly be practised on a small scale. Members discussed the paper, and generally agreed that spring draught was preferable to bridle draught on cultivating implements. Messrs. A. M. Robertson, W. Schuman, M. K. Frost, and the Chairman took part in the discussion.

YEELANNA.

July 31st.—Present: 11 members and one visitor.

Fodder Growing.—In a paper on this subject Mr. E. A. Schmidt explained the methods of growing fodder for stock in New Zealand, and referred to the possibility of adopting such methods locally. A farmer who owned a 40-acre paddock of clover in New Zealand was not only a dairy farmer, but he could also be a bee-keeper of some importance. Clover honey was excellent both in flavour and appearance. For fodder the clover could be treated as hay or ensilage. For the latter purpose it was collected immediately after mowing and placed in a pit or silo. On account of the heat which was generated, however, care must be taken not to stack too large a quantity at a time. The hay settled down and became so compact that

the silage required to be cut with a hay knife (an implement similar to a saw with big teeth). The silage had a high feeding value, and needed to be fed only in small quantities. Green straw remaining from a crop of oats which had been stripped when half ripe could be chaffed with ordinary hay, with the production of a good sample of chaff. The growth of turnips for fodder was practised on a large scale. Very large tops were produced, which were excellent feed for sheep. After some weeks of feeding, the turnip fields were cultivated, and the sheep were then able to clear the ground thoroughly. Kale, rape, and other such fodders were also extensively grown, and proved very profitable. Where land values were high owners could not afford to rely on natural pasture; it was necessary to resort to the growth of artificial grasses. Seeds were sown which produced excellent pasture in a short time. This pasture land was renovated every few years, being cultivated and re-sown with a different variety of grass on each occasion. Seeds of these grasses were also harvested to some extent. He thought that some of these practices should be tested in their district, as he was convinced that, in some instances at least, grazing would give better returns than wheat growing. The paper was well discussed by members, who thought that if grasses such as rye grass, clover, and peas were grown, not only could more stock be carried than was at present the case, but succeeding wheat crops would benefit. Dairy farming and stock raising would then return greater profits than were obtainable from wheat alone.

COLTON, July 24th.—Co-operation.—Two papers on this subject were read, and considerable discussion took place.

KOPPIO, July 20th.—Annual Meeting.—The annual election of officers took place, and the Hon. Secretary (Mr. W. R. Richardson) presented the annual report, which showed that ten meetings had been held during the year, with an average attendance of six members. The remainder of the evening was devoted to the entertainment of the visitors present.

MILTALIE, July 23rd.—Annual Meeting.—The election of officers took place, and the Hon. Secretary (Mr. E. Story) presented the annual report on the operations of the branch during the preceding 12 months. Ten meetings had been held, with an average attendance of 10 members. A number of useful papers had been contributed by members, and good discussions had taken place.

WARROW, August 3rd.—The inaugural meeting of this branch was devoted to the election of officers, preparation of programme, etc.

YALLUNDA (Average annual rainfall, 18in, to 19in.).

July 31st.-Present: 12 members.

Co-operation.—A lengthy paper dealing with the possibilities of the co-operative movement amongst farmers was read by Mr. H. P. Cabot. He urged that the huge profits which were being made by organisations handling the farmers' produce and requirements could be retained by the farmers if co-operation were effectively practised. The producers needed some place where they could secure their requirements, the business being worked on a percentage basis. Members freely discussed the subject of the paper.

EASTERN DISTRICT. EAST OF MOUNT LOFTY RANGES.)

BORRIKA.

July 24th.—Present: 18 members and nine visitors.

FARM MANAGEMENT.—Mr. E. H. Huxtable read a paper on this subject. He said that fallowing was the first step to successful farming. Cultivation of fallow land should be commenced as soon after seeding as possible in order to ensure des-

truction of weeds and conservation of soil moisture. When the first cultivation was completed the fallow land should only be worked lightly after each fall of rain. Sufficient hay should be cut at each harvest to meet the requirements of the farm until the succeeding harvest. Oaten hay was to be preferred to wheaten, but it should not be cut when green. Horses would be found to do better work when fed on oaten hay. Quantities of straw and cocky chaff should be conserved from time to time. A sufficient number of cows, pigs, and poultry should be kept to provide for household requirements. Mixed farming should be adopted as soon as practicable, and to this end sheep should be kept. Machinery should always be under cover, and maintained in proper order. Warm stables should be provided for the horses with a separate stall for each. In the discussion which followed Mr. Gray favored wheaten hay, and Messrs. Hart and Brown also supported his view. Mr. May explained simple methods of bookkeeping for the farm. Some discussion took place as to the advantages of deep ploughing.

BRINKLEY.

July 24th.—Present: 13 members.

CARE OF FARM HORSES.—In a paper on this subject Mr. E. Schenscher said that it was the duty of every farmer to see that his horses were well fed and groomed and comfortably stabled. Horses in constant work should have three feeds each day. For the night feed hay was to be recommended, as it required more mastication, and this aided digestion. For old horses a good feed consisted of cocky chaff, boiled oats, and bran or pollard. The oats should be mixed with the chaff and pollard when boiling hot. The feed should then be allowed to stand for four The oats should be mixed with the chaff or five hours before being given to the horses. Horses should always be allowed to drink before feeding. For regular work the horse should not be expected to do more than eight hours per day, and should have at least one and a half hours' rest in the middle of the day. The animal should be kept well groomed. Not only did this improve its appearance, but it assisted in the prevention of sore shoulders. In this connection the fitting of the collar was of the utmost importance. A good plan when using a new collar was to soak it in water, and when drained, by putting it on the horse the collar would take the impression of the horse's shoulder. Horses subject to sore shoulders should have collars lined with "beaver skin," which if greased, presented a very smooth surface. Correct feeding assisted materially in the prevention of such troubles. Green feed, such as lucerne hay or chaff, more particularly in the summer, would do much to keep the horse's blood in good order. During the winter early wheats would provide green feed for the horses. In discussing the paper, Mr. H. Pearson recommended the clipping of the horses' coats. They would then keep in better condition, and if warmly stabled would suffer no ill effects.

CLANFIELD (Average annual rainfall, 16in. to 17in.).

July 24th.—Present: nine members.

Farm By-Products.—A paper on this subject was read by Mr. J. H. Cockshell. The dairy cow, he said, was practically indispensable on a well-conducted farm. Three or four animals of a good milking strain, well fed, coming in, say, at April and September, would be found sufficient for most farms. Cleanliness, regularity of milking, and good treatment were essentials. Too many calves should not be reared, on account of the trouble involved. Fowls, for preference White Leghorns, should be kept in pens, the sheds being built of hardwood and iron. Green feed, such as lucerne and silver beet, cool clean water, with a little Epson salts added at intervals of about a week, should be given. Good White Leghorn pullets would be found to lay at from five to six months old. The district was unsuitable for ducks, geese, and turkeys. Pigs, carefully attended, and provided with abundance of water, would be found profitable. The red sand in this district would produce practically any variety of vegetable, provided it was well dressed with stable manure, and watered occasionally during dry spells. Lettuce, carrots, parsnips, red and silver beet did well in the white sand. If farmers adopted two or three side lines, as suggested, he thought a deal of difference would be made to the profit of the holding. Members generally agreed with the remarks of the writer of the paper,

with the exception that some thought it desirable to rear the calves. Mr. Wilkin thought cocky chaff, bran, and copra cake, constituted a good ration for dairy cows in the absence of green feed. Messrs. Hayward,, Orwell, and Moar also spoke.

COOMANDOOK (Average annual rainfall, 18.01in.).

August 21st.—Present: 12 members.

Mallee Stumps.—Mr. R. Upton, sen., read a paper dealing with the question of leaving stumps in the ground, if dead. Mr. H. Hughes expressed the opinion that for pasture, stony land was better left unploughed if the stumps were killed. Mr. A. S. Chapman said that, for wheat-growing the stumps should be removed from the land, and Mr. Ninnis agreed in this. Mr. Guy said that if good grass was expected the land should be cultivated. Mr. O. Blucher said that it would not pay to market stumps if they had to be carted a long distance to the railway. Mr. H. Marsh favored the removal of all stumps from the ground. Mr. L. Williams said that it would require a long period of time for stumps to decay in the ground. Mr. R. Upton, sen., said that when an efficient shoot scorcher was available, the best practice would be to scorch off a certain area each year, and leave the land out to grazing, so that the stumps would decay in the ground, and this view was endorsed by the meeting.

COONALPYN (Average annual rainfall, 17.49in.).

August 20th.—Present: 10 members and three visitors.

STOCK BREEDING.—Mr. Hoperaft contributed a paper in which he urged Government assistance to the farmer in the direction of stock breeding. He submitted a scheme under which it was proposed that farmers could purchase from the Government on extended terms first-class stallions. Some discussion took place, and it was decided to draft a scheme to be submitted to the Advisory Board. It was decided that the Branch should, as far as possible, adopt the functions of a local vigilance committee.

GLENCOPE.

July 24th.—Present: nine members.

Farm Implements.—In a paper on this subject, Mr. S. Cope emphasized the need for better workmanship in the manufacture of implements used for farming operations. At present the materials used were very inferior, and the workmanship was very faulty, more particularly in connection with the quality of the bearings and the methods of lubrication. The bearings were very roughly made, with the result that they very quickly wore out. The lubrication was intermittent, and very often permitted the passage of dust right into the bearings. The cost of the new machines was too high in view of their quality, and the cost of additional parts was also very excessive. He suggested combined action on the part of the Agricultural Bureaux with the object of drawing up specifications for the various machaines and implements. A co-operative foundry might possibly be established to manufacture high-grade implements, or arrangements could be made with a firm to carry out the work. On certain implements the woodwork was very inferior, and the painting also was far from satisfactory. All these matters could be rectified if farmers would take some action on the lines suggested. Members discussed the paper, and generally agreed that there was room for considerable improvement in the manufacture of farming implements.

McNAMARA BORE.

Present: eight members.

THE GARDEN ON THE MALLEE FARM.—The following paper was read by Mr. H. Sanders:—'Attached to every farm there should be an acre or two securely fenced and netted for a garden. While two acres is too much for the farmer to

look after as a garden, it is well to have the patch large, and the ground not in garden can easily be used for experimenting with the different fodders, roots, and grasses. As there is generally plenty of stable manure available on the farm, even if the ground is not of the best at the start it can soon be made so. In selecting the land, care must be taken to avoid sites exposed to strong winds. natural breakwind is not available one must provide either a stump wall or brush fence until either gums, pines, or almonds can be grown. Plant a row of almonds round the outside about 10ft. apart. Brandis make the best breakwind, but are not the best cropper. B.I. or I.X.L. are good croppers and fair trees. As almonds are strong growers, it is advisable to leave a headland of about 20ft. to 24ft. be-About 16ft. each way is a fair distance between the fore the first row of trees. trees, or when plenty of manure is available a little less will not hurt; about 8ft. We naturally aim at getting our fruit spread over as long a will do for vines. period as possible, so two or more of the different sorts are better than a lot of Taking apricots first, the Newcastle is early and a good cropper; the Royal or Oulins Early and the Moorpark or Bush Peach later. In peaches we can have Briggs' Red May, followed by Hales' Early, then Royal George or Early Crawford (a yellow peach), or Elberta, then Sea Eagle, Solwey, and Lady Palmerston. A few nectarines will always do well, also plums. The Early Violet and the Orleans and Diamonds (dark plums), Egg plums and Golden Drop (white plums), Burbanks and Wicksons Japs. are good. In apples only the hardier sorts will do here. The Nelson for early cooker, Shepard's Early eating, Pomeroy, and Scarlet Nonpariel, and Dunn's Seedling should do all right. In pears there are Duchess, Josephine de Malins, and late Duchess (eating), and Vicar of Winkfield Oranges should do well, but must be protected from and Napoleons for cooking. The Washington Navel, St. Michael, Selletta, and Paramatta are all the wind. A couple of lemons, three or four figs, and a mulberry tree will be found In vines, Sweetwater, Muscatel, and Doradilla in white, and Black very useful. Hamburg, Red Prince, and Malaga Muscat should do well. The ground for planting should be ploughed as deeply as possible, and worked down. Take out a good deep hole, the bigger the better, but not less than 2ft. 6in. square, and about 18in. deep. Do not put the clay back in the hole, but fill in with top soil mixed with well rotted manure, and if bonedust is available a couple of pounds Fill in the holes to within a few inches of the top, and will do a lot of good. tread them firmly, so that the trees, when planted, will not sink. Leave the centre of the hole higher than the sides so that the roots will hang down. Cut back all damaged roots, and cut the top hard back when planting. As a general rule, the trees should be planted so that when they have settled down they are just a trifle deeper than they were in the nursery. Vines do not require such a large hole as trees, and should be planted about a foot or more deep; in the case of cuttings, the deeper the better, up to 18in. or so. When cuttings are planted, care must be taken to tread the ground firmly at the bottom to exclude all air spaces. In planting trees, I tread the earth very lightly on the roots, then nearly fill the hole, and give a bucket of water, and as soon as the warm weather begins, mulch with manure, straw, or any litter available. The best time to plant deciduous trees is about the end of June or early in July, and for citrus trees either in April or end of August or early September. Although it is not advisable to plant vegetables between trees, generally for the first two or three years they will not hurt. and the watering of the vegetables will do the trees good. All vegetables that will stand frost, such as cabbage, lettuce, beans, peas, etc., will do well here. Tomatoes do well on the bore water, also the different kinds of beet; in fact, all roots do well. However, the water does not seem to suit French beans. parsnips, turnips, and beetroot should be planted in the autumn. Early Sunrise, planted at the end of February or early March, will usually succeed, but for the main crop plant Sunrise, William Hurst, and Yorkshire Hero about the end of June or early July. Onions do very well, the seed should be sown early in March, and transplanted about the end of June or early July. Early tomatoes must be raised in a hotbed or under glass, and transplanted when the frost is over. Potatoes planted about August or September and finished off with irrigation do very well, and any spare ground can very profitably be sown with melons, either water or pie. If sown about September they will germinate as soon as the ground is warm enough. As neither trees nor vegetables will thrive with weeds, the ground must be kept thoroughly cultivated to keep down weeds, and conserve moisture and nitrogen, in which our soils are very deficient."

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).
July 24th.—Present: 16 members and three visitors.

SHEARING.—Mr. J. G. H. Paech read a paper on this subject. The necessary gear for shearing, he said, should include not less than two pairs of good shears, and two whetstones, one hard and one soft. For soft wool, the hard stone would secure a better cutting edge on the shears, and vice versa. The shears should be carefully set and sharpened. Sheep should not be pulled from the pen by the hind leg; but should be picked up and carried. When shearing he made three sides, as this enabled him to see the cuts better; and, further, the best wool on the back was likely to be spoiled by second cuts. His procedure in shearing was to take off the belly and crutch; proceed up the neck, clean the head, then below the first shoulder, over the back, down the tail, and then the last side. The shearer should be careful not to stain the wool by stepping on it.

MYPOLONGA.

August 18th.—Present: 17 members and six visitors.

Pigs.—The Hon. Secretary (Mr. G. G. Hall) read a paper on this subject. said the Berkshire and Essex breeds were the best all round. The Berkshire pigs were noted for their fine bone, muscularity, firm flesh, and excellent hams and shoul-Their constitutions, also, as a general rule, were excellent. The Berkshire should have a short snout, face broad between the eyes, ears almost erect, and softshowing veins, neck short and thick, back broad and straight, long ribs, hams thick, round and deep, small tail, legs short, but straight and well set apart, hair soft and The Essex was the best breed for porkers, as they were not too fat, and the They could, with advantage, be crossed with coarse breeds, sows were prolific. The Essex, in shape and color was and produced quiet and easily fattened pigs. and product and can't ca produced first-class marketable pigs. The boar should be at least 10 months old before being used for service, and the sow should be 12 or 13 months old before being used for breeding purposes. A sow should not have more than two litters in If properly cared for the sow should have little or no trouble at the each year. For the first 24 hours after farrowing she should have little time of farrowing. On the second day it was a good plan to give her a few quarts of warm water, and afterwards feed on a warm mash of bran mixed with milk. succeeding two or three days the feed should consist of warm slop food in moderation. By overfeeding the sow during the period after farrowing, she became liable to such troubles as milk fever and dried udder. After three or four weeks, the young pigs would require additional food, and crushed grain should be given If the sow were fed to produce a large flow of milk, the young pigs would not be weaned until from eight to 10 weeks old. The eating of the young pigs The only way to avoid it was by the sow was the result of a depraved appetite. to watch the sow closely at the time of delivery, and remove the pigs, returning them at intervals of two hours for nursing and again removing them; if this were continued for three or four days, the danger would be passed. Pigs should be eastrated when two to three weeks old. He emphasized the necessity for keeping castrated when two to three weeks old. He emphasized the necessity for keeping sties clean, to guard against the possibility of infection with such diseases as swine fever or tuberculosis. Pigs should have opportunities for exercise, and should have access to small coal, ashes, and salt. The degree of success achieved depended largely upon the treatment the pigs received. Discussion followed. Most members favored the crossing of the Berkshire pig with either the Tamworth or British black breeds, as they grew faster and made better bacon pigs than pure Berkshire. A fattening ration for pigs was suggested as follows:—(1) Lucerne chaff, molasses, and pollard; (2) sunflower seed and maize.

PARILLA WELL (Average annual rainfall, 16in. to 17in.).
July 22nd.—Present: eight members.

POULTRY.—A paper on this subject was contributed by Mr. J. W. Johnston. He advised farmers to keep from 50 to 100 hens of a heavy breed, for laying

the first year, and table purposes subsequently. He had tried White Leghorns for laying purposes only; but this practice was not profitable. Except when breeding, the roosters should be kept by themselves. When eggs were plentiful, it was advisable to pickle a supply for cooking purposes. For the laying flock, a house 18ft. long, 7½ft. wide, 5½ft. high in front and 5ft. at the back, should be erected of iron and sawn timber. Portable perches 18in. high should be installed. Cool water, charcoal, and stone grit were necessary.

PARRAKIE (Average annual rainfall, 16in. to 17in.). August 21st.—Present: 12 members and two visitors.

Sore Shoulders.—Mr. M. J. Cooney read a paper on this subject. He said that sore shoulders on horses were usually the result of accident or carelessness. and the resultant bruises often caused sores, and these could be avoided to a large degree by the use of draught springs. The fitting of the collar was of the utmost importance. When it was seen that this was not satisfactory, it should have Amateur work would not prove a sucimmediate attention by a practised man. When a collar was remodelled care should be taken that it did not cause the development of fresh sores. A breastband could often be substituted for a collar This could be made from a double strip of bran bag stuffed with good results. evenly with horse hair and sewn on to a 6in. wide strip of heavy leather, having Particular care was required in the fitting of a collar for a hooks at the ends. The collar should fit closely, so long as there was no pressure on the young horse. neck. An excellent practice was to bathe the horses' shoulders with water, whenever they finished work in an over-heated condition. When sores did appear, bathing with warm water and dressing with vaseline was the treatment he recom-The collar, of course, should not be allowed to chafe the sores. Messrs. Randall and J. G. Temby supported the practice of frequent grooming and wash-Mr. Jose thought that sores were often caused through making horses work too long without rest, when commencing after a long spell. The horses should only be worked short hours to begin with, gradually increasing the period of work. The Chairman (Mr. R. L. Beddome), and Messrs. Lewis and W. Temby also spoke. BUREAU WORK .- In an address on this subject, the Chairman (Mr. R. L. Bed-

Bureau Work.—In an address on this subject, the Chairman (Mr. R. L. Beddome), appealed to members to stimulate local interest in Bureau work. He suggested the establishment of a question box, and said that the members should introduce to meetings specimens of weeds, crops affected with disease, or any such exhibits likely to promote discussion. All experiments carried out by individual farmers could well be discussed at Bureau meetings. He also suggested that a

field trial of implements should be instituted in the district.

SHERLOCK (Average annual rainfall, 14in. to 15in.). August 18th.

The meeting of this Branch was attended by the Superintendent of Experimental Work (Mr. W. J. Spafford) and the Assistant Secretary to the Advisory Board (Mr. H. J. Finnis). In the afternoon an inspection was made of various holdings in the district. The Sherlock Farming and Grazing Company's property, Coominya, was the first visited, and the general appointments of the farm were certainly deserving of the admiration expressed by the visitors. Particular interest was manifested in stud wheat plots, established for the purpose of ensuring a supply of pure selected seed for use on the farm. These, Mr. Genders explained, were to be continued "in perpetuity." They were commenced with the seed—secured from the Roseworthy Agricultural College—of the following varieties:—King's Red, Bayah, Federation, Queen Fair, and Gluyas. The stables were nicely partitioned off with railings into suitably sized stalls, the floor being paved with 15in. lengths of railway sleepers, which provided good drainage, and at the same time entailed little danger to the animals through a slippery surface. The poultry yard contained breeding pens and pens for single testing, and young pigs were very comfortably housed in limestone-walled sties, nicely thatched. A visit was then made to the property of Mr. W. J. Nock, whose manager (Mr. H. Platten) conducted the party over the cultivated area. Messrs. Stringer and A. Osborne's farms were also inspected. It speaks well for the enthusiasm of farmers in this

district that, in addition to those conducted at Coominya, stud wheat plots are being worked on the holdings of Messrs. Partridge and Nock. In the evening a meeting was held in Mr. A. Osborne's assembly room. Mr. Schneider (President) was in the chair. Addresses were delivered by Mr. Spafford and Mr. Finnis, and a programme of musical and elecutionary items was provided.

BERRI, July 26th.—Berseem.—The general impure state of seed of this crop was discussed by members. It was decided to request the Advisory Board to take steps to ensure good seed being available to Branches for next autumn.

PARILLA, July 23rd.—Annual Meeting.—The annual election of officers of the Branch took place. Labor-saying Appliances.—Mr. John Tee read a paper with this title. In the discussion on the paper varied opinions were expressed in regard to the suggestion that a tramway should be laid down between the hay-stack and chaffeutter.

RAMCO, July 26th.—Annual Meeting.—The Hon. Secretary (Mr. J. J. Odgers) presented the annual report, which showed that eleven meetings had been held during the previous year, and the adoption of the plan of arranging a programme of meetings had proved very successful.

WYNARKA, July 30th.—Annual Meeting.—The Hon. Secretary, Mr. S. G. Williams, presented the annual report of the branch for the year. Ten meetings had been held, with an average attendance of 12 members. Messrs. G. G. Masson, C. B. R. Wright, S. Thompson, J. B. Packham, J. W. Murphy, and D. J. Byard had enlisted with the Expeditionary Forces, and the last-named had been killed in action.

SOUTH AND HILLS DISTRICT.

CLARENDON (Average annual rainfall, 33.67in.).

June 21st.—Present: 16 members and seven visitors.

EXHIBITS.—Mr. J. Spencer tabled a fine specimen of long red mangolds, and strongly advised members to grow this crop, which provided excellent fodder.

In addition, Mr. Spencer showed Snowflake potatoes of good quality.

The House.—In an address on this subject, Mr. J. Potter said the most suitable horse for the farmer in the Clarendon district was the well-grown roadster. The animal should be from a fine-coated draught mare by a roadster sire. On no account should the foal, when weaned, be turned into a barren paddock; if it were stunted in growth it would never properly recover. A horse should never be driven on an empty stomach; feed should be given regularly. When working, the addition of a small quantity of linseed to the feed would be appreciated. A mixture of 11b. each of ground sulphur, resin, and saltpetre, given occasionally in a tablespoonful dose, would obviate trouble through the animals becoming hidebound. Mr. Phelps was opposed to mating the thoroughbred to the draught mare; he considered the roadster the ideal cross. Mr. J. Spencer concurred with the opinions of Mr. Potter.

HARTLEY (Average annual rainfall, 15in. to 16in.).

July 21st.—Present: 18 members and five visitors.

Annual Meeting.—The Hon. Secretary (Mr. J. Stanton), presented the annual report on the operations of the Branch during the preceding year. Thirteen ordinary and two homestead meetings had been held, and the average attendance of members at each was 15. Twenty papers had been contributed by members at meetings during the year.

MILKING Cow.—In a paper on this subject, Mr. S. Pratt said that, when breaking in a heifer, he did not recommend allowing it to keep its calf for more than 12 hours. The heifer would soon forget the calf, and give its milk more readily. It was well to accustom the heifer to leg-roping, as although it might not be necessary to always leg-rope her, there were occasions when it would probably save a lot of trouble to do so. The cow's teats should always be washed before milking, preferably with warm water, and the milker's hands should also be thoroughly cleansed. In discussing the paper various opinions were expressed by members in regard to leg-roping, and the time at which the calf should be taken from the heifer. Members agreed, however, that gentle handling was essential.

HARTLEY (Average annual rainfall, 15in. to 16in.).

July 30th.

A homestead meeting of the Branch was held at the farm of Mr. J. M. Hudd, Bletchley. After the visitors, among whom were the former Chairman off the Advisory Board of Agriculture (Mr. Laffer, M.P.), the Government Dairy Expert (Mr. P. H. Suter), Mr. H. S. Hudd, and "Agricola," of *The Register*, had been entertained at afternoon tea, a comprehensive tour was made of the farm, and at about 4.30 a halt was called at the cowyard, where Mr. Suter, with some of Mr. J. M. Hudd's pretty and admirably bred Jerseys providing a fitting background, and capital demonstration material, gave a forceful address on "The Management and Improvement of the Dairy Herd.'' The loyal toast was honored, and then Mr. H. S. Hudd proposed "The Empire." The health of Mrs. Brook was felicitously The toast of "Our Soldiers" was proposed by "Agricola," and Mr. J. Stanton (Secretary of the Hartley Branch) gave "Our Branch." In a brief resume of the year's work, he mentioned that 13 meetings and two homestead gatherings had been held, and 20 papers had been read by the members, besides which 66 questions. tions had been answered. He thought he could say with every justification that the Branch was a thoroughly live and up-to-date organisation. The average attendance had been 15 out of 25 members on the roll. Some experimental work had been inaugurated by Mr. Wundersitz, and he trusted that it would be continued. Nicholls was responsible for "Kindred Branches." Mrs. Clezy proposed Mrs. Clezy proposed "The visitors," and the health of Mr. Suter was drunk at the instance of Mr. Lehmann. Mr. Laffer moved a vote of thanks to Mr. and Mrs. Hudd for their generous hospitality.

KANMANTOO (Average annual rainfall, 17.90in.).

August 21st.—Present: 13 members and one visitor.

VEGETABLE GROWING.—Mr. H. Downing read a paper on this subject. that wherever possible, farmers should grow sufficient vegetables for their own re-The difficulty of water supply, in many instances, precluded the growing of green vegetables during the hot summer months, but by sowing carly and late varieties, supplies could be obtained during the greater part of the year. For the growing of potatoes good cultivation was essential; good seed should be sown, and liberal applications of manure should be given. Carmen No. 1, Upto-date, and Pinkeye varieties were usually successful whether planted late or early. These were the best varieties for their district. For onion growing, good cultivation was also necessary and rich, sandy, loam soil was to be preferred; heavy soils would require to be very well cultivated. The best varieties were Brown Globe, and Brown and White Spanish. Cabbages, cauliflowers, and lettuces required an abundance of manure, which should be worked into the ground before An occasional watering with liquid manure would considerably assist the growth of these vegetables, more particularly cauliflowers. Carrots and parsnips thrived best in rich, sandy loam, but they also did very well in heavy soil if well worked. For manuring carrots and parsnips, well-rotted farmyard manure should be dug into the soil. For early crops, seed should be sown in March, and for late crops in July. Melons of all kinds, cucumbers, and pumpkins could be grown on almost every farm, and not only were the latter very useful for household purposes, but they could be utilised for stock feed. For growing these, holes should be dug, say, 4ft. in diameter, and 18in. deep; into these should be put layers

of stable manure 10in. or 12in. in thickness, and then filled with good earth. Five or six seeds could be sown in each hole, and if they all germinated, the number of plants could be reduced to three. Seeds could be sown in August, September, and October. Seeds sown in August should be covered with good rich soil, and surrounded with stable manure, which will provide warmth to assist the germination of the seeds.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

July 24th.—Present: eight members.

Co-operative Marketing .- Mr. W. Nicholls contributed a paper in which he criticised the present system of marketing, as being unsatisfactory from the standpoint of the producer, and also from that of a large section of the buyers. suggested the organisation of gardeners as a means of improving the position, on a basis such as the following:—'1. That the gardening districts of the State should be divided into four or more districts. 2. That each member of the association pay an annual subscription of £1. 3. That the members agree to allow the association to handle the whole of their produce entirely for the local market, and that they grade it and deliver it at the association depot. 4. That the association undertake to sell or purchase the whole of the members' output, making a selling charge of 5 per cent. commission. 5. The central executive of the association appoint a manager to work with a management committee consisting of one representative from each district. 6. The duty of the management committee would be to receive the produce from the members of the association, examine and confirm or reduce the grading, as required by the standard fixed for each particular line, and to fix the price for several grades. 7. At the conclusion of the market the committee would take stock of all unsold produce, and make a proportionate reduction from the price of that sold necessary to make a sum sufficient to purchase the whole of the unsold portion at the same all-round price. The last proposal is the essential part of the whole scheme, and by some may be regarded as too radical. propose to show its feasibility by comparing it with the present system. take a supposition case. The market opens with 2,000 dozen cabbages, for which we are asking, and ought fairly to get, 3s. per dozen. It is found that only 1,900 dozen are required to satisfy the demands of the market, leaving a surplus of 100 Immediately the whole market is disorganised, and there is a drop in the price of at least 33 per cent., perhaps a great deal more, but taking it at that it would mean a drop from 3s. to 2s., or loss of £100, even if they were all saleable at the lower figure. Now take my suggestion. The association fixes the price at 3s. per dozen, and sells 1,900 dozen, total £285, from which they would deduct sufficient to pay for the 100 dozen unsold, about £14 5s., leaving £270 15s., from which we would take a further £14 5s., being 5 per cent. selling commission, £256 10s., or a clear gain of £56 10s., and growers would receive approximately 2s. 6ad. per dozen, against 2s, under the old system. The association would have 100 dozen cabbage, for which it is possible a market might be found in some part of the country, not Evaporated vegetables are a commernow catered for by the hawkers or packers. cial commodity much in demand in some parts of the world, and I certainly think that if this idea were carried out on proper lines, growers would soon be in a position to have their own evaporation works, when the problem of the surplus would be solved.' It was agreed that good would follow the organisation of the market garden and fruitgrowing industries as suggested. The evaporation of vegetables, and extension of markets, could thus be given attention, and the general interests of the industries protected.

MYPONGA.

July 28th.—Present: seven members and one visitor.

Fruitgrowing.—In an address on this subject, Mr. C. H. Beaumont emphasized the necessity for great care in the selection of a site for an orchard. An easterly aspect was desirable, and good soil, well drained. He condemned the practice of planting trees in land which had not been previously cultivated. Where necessary, drain pipes should be laid in the orchard before planting; they could be obtained at very reasonable rates. The trenches for the pipes should be constructed with

a special narrow spade, and should be dug right through the soil and a few Where it was intended to work the orchard with horse inches into the subsoil. strength, the trees should be planted 20ft. apart, but if hand cultivation was proposed 15ft. apart would be sufficient. Holes should be 4ft. square and 1ft. deep, and the roots of the trees should be combed out at the time of planting. district, May would be the best month for planting. He advised the selection of a few proved varieties of each kind of fruit. It was well to dispense with any weak or damaged young trees, as they seldom eventually became healthy. moth, the effective treatment consisted in spraying with arsenate of lead. woolly and peach aphis, resin wash was an effective spraying solution, while Bor-To secure the best returns deaux mixture should be used for fungoid diseases. care should be exercised in the harvesting and marketing of the fruit. He advocated grading for either local or oversea markets. Mr. Beaumont replied to a number of questions put to him by the audience.

STRATHALBYN (Average annual rainfall, 19.28in.). July 27th.—Present: 27 members.

LUCERNE CULTIVATION.—Mr. F. Allison read a paper on this subject. He said he was confident that lucerne could be grown with profit on light sandy and lime-stone soils, and he would advise every farmer to have a plot of this fodder, and thus secure green feed for the summer months. As much care as circumstances would permit should be taken in the selection of a suitable piece of ground. A level surface was advisable, especially if it were going to be irrigated, as a moderately steep grade would be liable to drain the water away too much. There was no special need for this, however, if not intended for irrigation. All stones and other obstructions should be removed before applying the manure to the land. He recommended a dressing of good rotten stable manure at the rate of 25 to 30 dray loads per acre, and then ploughing to a depth of 5 to 6 inches, afterwards working it down to a very fine tilth. When sufficiently fine the land should be rolled and harrowed carefully, and after sowing should again be rolled. It was very important to obtain the very best of seed. Some guarantee should always be obtained that the seed was true to name and free from foreign seeds. The Hunter River variety had been proved superior to all rivals. Seed, if possible, should be obtained from plants grown in the State, the advantage of this being that it had become acclimatised, and would adapt itself more easily to the local conditions. Seed that had been gathered from irrigated land, or taken from low-lying flats, should not be sown, for the reason that the plant having been forced in growth, would produce a weak, soft seed, without any stamina, and the seed produce a weak, sickly plant. There was great diversity of opinion in regard to time of sowing. It would be unwise to sow in the autumn. Lucerne was a frail plant in its early life, and great care should be taken to safeguard it in that stage. After having kept the land well worked to kill the weeds, the seed should be sown during the latter part of August in their district—possibly a month later in the hills—and if thought necessary some other grain could be sown very thinly at the same time, which would help protect and nurse the lucerne plant. Great care should be taken that the seed was not sown too deeply. One very good method was to take the springs off the disc, or hoes, on the drill and let them run on top of the ground, sowing with the manure-feed through the drill in the usual way. If desired to sow say lewt. of super. and 15lbs. of seed per acre, it would only be advisable to mix one or two bags at a time ahead of the sowing, because the acid in the super. would tend to spoil the germination. The general method in sowing this seed was by hand, and a very calm day was necessary to sow it evenly. If it was not intended to irrigate the land, then 6lbs. to 8lbs. would be ample seed to sow, with good sound seed. The crop should be cut when the bloom was from one-third to one-half on the plant; if it was cut much later than this stage it would become hard and tough, and would lose much of its feeding value; if, on the other hand, it was cut too soon it would be watery and contain very little nutriment If during the cutting season a weighted harrow were run over the ground it would materially improve the next cut. After the cutting was finished a heavy dressing of stable manure would ensure a good crop for the next year.

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

June 7th.—Present: nine members and one visitor.

ORCHARD PLANTING .- In a paper on this subject, Mr. W. Squires said it was advisable to well work orchard land before planting. Varieties of known suitability to the district, if not raised by the intending planter, should be secured from a re-In the latter case he would leave the trees with the nurseryliable nurservman. man for 12 months longer than was the usual practice. Holes for the reception of young trees should be about 2ft. 6in. across, and 1ft. 6in. deep. should not be put in to a depth greater than 3in. or 4in., the roots being directed well downward and spread out. He preferred the septuple to the square method of laying out the orchard, with the trees 20ft. apart. Each tree should receive three handfuls of bonedust. Pears, apples, plums, and cherries should be pruned hard for the first three years; after which they should be allowed to set plenty of fruit wood. Peaches, apricots, and nectarines should be kept well open in the centre; it was necessary to prune for young wood every year with these. In dealing with old apples, pears, and plums, it was wise to thin out all the undergrowth, as the buds on the top were more healthy. Hard pruning resulted in an abundance of wood, but little fruit. Pruning tools should be kept sharp, to obviate bruis-To destroy red spider and woolly aphis, he advised spraying ing the wood. with Gargoyle oil, 1gall. to 20galls. of water, when the trees were dormant. For Fusicladium in a wet winter he would spray with a mixture of 1lb. lime, 1lb. bluestone to 8galls. water; the latter being increased to 10galls. in a dry winter. This should be applied two or three times before the petals dropped. For codlin moth he would spray as soon as the petals had fallen with a mixture of 11b, arsenate of lead to 20galls. of water; the spraying being repeated a fortnight later, and later on again. The single-nozzled pump was preferred. Old trees should be dressed with bonedust at the rate of 5cwt. to the acre. Mr. Rowe thought there was a tendency to prune the trees too hard, and advised the application of artificial fertilisers to orchard lands.

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

July 5th.—Present: 13 members and one visitor.

Annual Meeting.—The Secretary (Mr. G. Prentice) read the annual report on the work of the Branch during the past 12 months, and the election of officers for the forthcoming year took place.

Selling Vegetables by Weight.—In a paper on this subject, Mr. H. F. Johnson referred to the time which was wasted in bunching root crops together for marketing. He suggested that they should be sold by weight. This would mean a considerable saving in labor for the grower, and also a saving in the eartage of vegetables to market. The packers, hawkers, and middlemen would welcome the adoption of such a system. Under present circumstances the retailers often received vegetables in a loose state, and had to make them up into fresh bunches. Moreover, the system of selling would be standardised, and the gardener who grew large vegetables of good quality would receive fair remuneration.

CLARENDON, July 27th.—The Hon. Secretary (Mr. T. B. Brooks) presented the annual report of the Branch for the previous 12 months, and the election of officers for the succeeding year took place. Mr. Phelps exhibited samples of King's Early wheat and barley green feed, and Mr. Potter tabled a fine pumpkin, which was admired by members.

LONGWOOD, August 21st.—Homestead Meeting.—The meeting was held at the homestead of Mr. Blakely, and an interesting time was spent inspecting the orchard and garden.

MORPHETT VALE, July 29th.—Annual Meeting.—The Hon. Secretary (Mr. E. E. Hunt) presented the annual report, which showed that 11 meetings had been held, with an average attendance of 11 members at each. Interesting and useful work had been done by the Branch during the preceding 12 months.

MOUNT BARKER, June 25th.—The Director of Agriculture (Prof. A. J. Perkins) was present, and delivered an address on "Farm Live Stock."

SOUTH-EAST DISTRICT.

KYBYBOLITE (Average annual rainfall, 22in.). July 22nd.—Present: 13 members and one visitor.

Lessons from the Drought.—A paper with this title was read by Mr. II. B. Schinkel. He said the two worst effects of the drought were the failure of the crops and the loss of stock. The first mentioned was due to insufficient rainfall, and, to a certain extent, lack of thoroughness in methods of cultivation. Deep ploughing and cultivation offered marked advantages over shallow fallowing in the direction of conservation of moisture. The frequency with which fallow land should be worked depended on circumstances, and each farmer would have to decide for himself. There was no doubt that room for improvement existed in the matter of cultivation. In the matter of loss of stock, with foresight a great deal of this could have been avoided. Where surplus sheep were to be sold off shears they should be marketed as quickly as possible, so that there should be an abundance of feed to carry the remaining sheep through the summer. In the good years better provision should have been made against drought in the direction of

LUCINDALE (Average annual rainfall, 23.32in.).

reserving hay supplies. Straw could well be saved and stacked, to be used in times of scarcity. Water supply was also an important consideration, more particularly in the summer, and where dams and tanks were relied upon, better provision

July 31st.—Present: 10 members and two visitors.

Annual Meeting.—The Hon. Secretary (Mr. P. H. Dow) presented the annual report of the branch for the year. Five ordinary and one homestead meetings had been held, and a number of instructive papers had been contributed

by members.

should be made.

Farm Tools.—In a paper on this subject Mr. W. Secker said that there were a number of repairing and odd jobs which could be done by a farmer if he provided himself with the necessary tools, and a considerable amount of time and money could thus be saved. A forge was very necessary, and in conjunction with it a couple of pairs of tongs and an engineer's hammer, and also an anvil. A forge could be purchased for £2 and upwards, and a suitable anvil for 27s. 6d.. A drill was a very useful machine to have, and could be purchased for 32s. A set of taps and dies would frequently be found very useful on the farm, and they could be bought for 38s. A good cold chisel could be made from an old rasp or file, and would be found very serviceable. Carpenters' chisels, rachet brace and bits, leather punch, and a vice might also be regarded as essentials to the workshop. Supplies of copper rivets, and, of course, nails and screws of various sizes, were required. All these tools would not necessarily be obtained at the outset by a new settler, but a few could be purchased from time to time, until a good range of tools would be available.

MOUNT GAMBIER (Average annual rainfall, 32in.).

August 14th.—Present: 24 members.

Testing Phosphate Rock.—Mr. H. L. Kennedy gave a demonstration of the method of testing phosphate rocks. He handed around for inspection samples of Christmas Island and Ocean Island phosphate rock, and said that in the manufacture of the phosphate from this rock it was ground up, and then sulphuric acid was used to convert the tri-basic phosphate into mono-basic. In other words the insoluble phosphate was converted into a condition in which it was soluble. After this was done the super. was dried, ground again, and bagged up. The rock used must contain 60 per cent. of phosphatic acid to be of value commercially, although that containing 50 per cent. was used and mixed with higher grade rock. Mr. Kenuedy gave demonstrations in regard to the solubility of superphosphate, and the insolubility of phosphate rock, and then a demonstration of the method of ascertaining the phosphatic contents of phosphate rock by means of nitric acid, and

ammonium molybdate. Mr. Kennedy said that nearly all the stone about their district contained lime, but the difficulty was to ascertain the quantity of other ingredients, particularly magnesia. In reply to Mr. Keegan, Mr. Kennedy said that in the assay of phosphatic rock acid tests could be used, because the action of the acids simply transformed the phosphatic acid from an insoluble to soluble condition. If acids were used on limestone the lime would all go into solution.

NARACOORTE (Average annual rainfall, 22.60in.). July 10th.

Annual Report.—The Hon. Secretary (Mr. W. H. Smith read a most interesting report of the proceedings of the Branch during the year. In recording the attainments of the Branch in the period under notice, it was mentioned that there were a greater number of members on the roll at the close of the session than in any previous year, the number of new members admitted, viz., 17, was greater than for any other year, more papers were read at the meetings, and the average attendance of members had been higher than during any other similar term since the inception of the Branch. A resume of the activities of the Branch during the period concluded the report.

PRESENTATION TO HON. SECRETARY.—As a token of recognition of the efforts of the Hon. Secretary (Mr. W. H. Smith) in promoting the interests of the Branch, the Chairman, on behalf of members, presented him with a silver-mounted pipe. Eulogistic reference was made to the success of his work. Mr. Smith suitably re-

sponded.

FORAGE CROPS.—The following paper on this subject was read by the Chairman (Mr. S. H. Schinekel):—"For our district and the benefit of our stock we may class forage crops under seven headings, viz., cereals, white mustard, cabbage family, leguminous plants, root crops, inclous, and the sorghum family, and I will deal with them in that order. Of cereals for early green feed we have a fairly large variety from which to choose. The following will, I think, be found suitable to our soils and climatic conditions:—For wheat—King's Early, Steinwedel, and Nhill. They are quick growers, and produce a lot of flag. Then we have Algerian and Cape oats, Cape barley and rye, all good for early green feed. If the best results are to be obtained from cereals as green feed they should be sown on well prepared fallow, failing that they should follow a leguminous crop. Fallow land has a great advantage masmuch as it can be sown much earlier, or in other words, grain sown therein will germinate with less rain owing to the amount of moisture which can be conserved. As all cereals when sown for green feed are sown early, it is very necessary that they should be sown a fair depth so that the seed may be in contact with moisture. For early green feed heavy manuring and thick sowing are necessary, as well as good cultivation. A rich, loamy soil generally gives best results, as it retains the moisture very much better than our heavy black soils. The same remarks apply to Aglerian oats and Cape barley. Rye and Cape barley grow fairly well on our poor sandy soil, provided it has a liberal application of manure, rye being preferable for that class of land. White mustard for early winter feed must be sown early. It grows well on our heavy black soils, and also on our poorer classes of soil if well supplied with manure. It is best to sow from 6lbs. to 8lbs. of seed per acre, very shallow. Mustard grows very quickly, and makes very good feed for ewes and lambs. It certainly is not the best for milking cows, as it has a tendency to taint the milk; it is only good for winter feed. It may be fed off or cut, but always before it goes to seed. In good seasons it may be fed off two or three times. Cabbage Family.—Here again we have a wide selection, i.e., kale, rape, chou moellier, Chinese cabbage, and others. These plants, like nearly all their kind, are gross feeders, and need heavy manuring. Kale may be sown with a drill in the field, or in a small bed, like cabbages, and transplanted. If it is intended to be transplanted, the seed should be sown in a small bed about April or May, the plants will then be ready to put out in July or August. planting use an old piece of fencing wire, tie pieces of binder twine every 4ft., fasten a stick 4ft. long each end of the wire, fasten the wire to the fence of the field with the stick, pull the wire tight and peg at the other end. Make a hole with a dibber at each tie of the twine and put in plants. When the first line is completed, shift the wire the same distance as the length of the stick, continue doing

this until completed, and all the plants will be in rows convenient for cultivating four ways with Planet Junior cultivator. Cultivating will be found very beneficial for keeping down weeds and conserving moisture for the summer months, but do not At 4ft. apart it takes 2,732 plants to cover one acre, and cultivate too deeply. half a pound of seed carefully sown should easily supply that number. Chou mocllier may be treated in the same way. If sowing kale directly in the field mix seed with super, at the rate of about one and a half or two pounds per acre. should be worked down fairly fine, and the seed must not be sown deeply. chou moellier, and Chinese cabbage may be sown in the same way. For rape use two to two and a half pounds per acre, chou moellier one and a half pounds, and Chinese cabbage four to five pounds. For directly sowing in the field we have two seasons of the year, viz., autumn and early spring, say August. They may be sown by themselves or in a cereal crop, if it is not too far advanced, and then rolled. In this way the sowing can be done by hand or with a small seed sower. etc., sown in August is not very likely to go to seed the first year, and it will do very little damage, if any, to cereal crops. Do not sow Chinese cabbage with the crop, as it always goes to seed the first year. I have sown chou moellier with wheat and oats in May and June and never regretted doing so, finding it provides a good lot of green feed for stock during the summer and following winter. If sowing with a cereal crop only use about one-third the amount of seed quoted above. When feeding off any of the cabbage family it is always wise to take the sheep off when the plants are fairly well stripped, particularly in the summer months. If constantly fed off the plants are likely to die. Where kale or chou mocllier has been If contransplanted, it is much better to strip the leaves as required and feed to stock. Leguminous Plants.—I cannot claim that I have had much experience with the clover family, so will confine my remarks to peas and vetches. These will grow on almost any soil, provided it has a good drainage. For peas, sow about 2bush. per acre about the end of June, or in July. I cannot say that I have found vetches to be a success by themselves, but they are very useful if sown as a mixture in an early green feed crop. Use one part of vetches to three parts of other seed. Root Crops.—We can safely confine these to mangolds, sugar beet, and turnips. Mangolds do best in a good loamy soil. They also do well on our heavy black soil, provided it is not too clayey. The land must be heavily manured with stable manure; 40 dray loads is not too much per acre. This should be carted out in the autumn, before the land becomes too wet, as the constant carting of manure when the land is wet causes it to become sodden. This is very detrimental to a mangold Carting out the manure in autumn also saves labor in weed destruction. Plough the land deeply when the manure is spread, and harrow down to a fine tilth to encourage weeds to germinate. As these weeds appear kill with a cultivator, or The more often the land is ploughed the more weeds will preferably the plough. be destroyed, and the land will be brought into a good state of fertility. As soon as the mangolds are well through, a good eye should be kept on weeds. Use the Planet Junior freely, but not too deeply. Give the young plants a dressing of salt, from 2cwts. to 5cwts. per acre. Salt is a good dressing for mangolds; it will help to check some of the weeds, while it also destroys slugs, &c. Kainit or sulphate of potash are both very useful manures for this crop. If kainit is used the salt may be omitted. When plants are from 3in. to 4in. high, thin them out to about one When the mangolds have a fair amount of foliage the outer leaves may be stripped, but on no account should the centre ones be interfered with. Mangolds take a long time to mature, and are not at their greatest value till about June, July, and later. They then contain the greatest amount of sugar. When matured they can be pulled out and carefully stored and fed to stock for July, August, and September. With good cultivation and manuring 50 tons per acre can be grown in this district. We have different varieties—the long reds and the globe. The former require a deeper soil than the latter. The yellow globe variety contains more sugar than the long reds, but, as a rule, is not such a heavy cropper with the exception of Carter's Windsor (yellow globe), which has always given larger returns with me than the long reds. Sowing should be done about the end of August or early in September. The seed can be sown with the ordinary seed drill. A 13-hoe drill suits very well. Take the pins out of the stars or cone of manure feed numbers 2, 3, 4, 6, 7, 8, 10, 11, and 12. This will leave only numbers 1, 5, 9, and 13 casting manure, the drills being 2ft. 4in. apart. the drill as though to cast 1cwt. of super. per acre, mix 31bs. or 41bs. of mangold seed with about 30lbs. of super., put this in the drill, and sow about lin. deep.

This should sow about one acre. An assistant is required for sowing mangelds in this way. The assistant keeps the lid of the manure box open, and constantly stirs the mixed super. and seed with his hand. This prevents the light seed working to the top of the super., and ensures an even distribution. Sugar Beet requires the same treatment as mangolds, but needs less salt. The plants, being smaller than mangolds, the rows can be closer, and a little more seed used. Sugar beet has a much higher feeding value than any mangold, and is deserving of much more attention than it receives. Like the mangold, it involves a great deal of labor, and therefore is not valued by the tired man. Field turnips may be sown during two seasons of the year, viz., autumn and August. They do best on a light, loamy soil; and also do well on our black soils, which contain a good supply of humus. Some of our good swamps when dry should grow them to perfection. The land must be worked down to a fine tilth. The seed should be sown with the drill as directed for mangolds, the rows being 14in. or 21in. apart. Use from 3lbs. to 4lbs. of seed per acre, and sow very shallow. No assistant is required for sowing After cultivation similar to that advised for mangolds, turnips can be turnips. grazed by sheep, or they can be pulled when matured, stored, and fed to stock as required. They will sometimes keep a good while under cover. Turnips do not require such heavy dressings of manure as mangolds. Scotch purple top have given best returns with me. We have a great deal of light sandy country in this district, which, with very little cultivating or manuring, will grow the larger varieties of piemelons. All that is necessary is to plough the land in August, cultivate or harrow about the end of September, walk over the land with the seed, put four or five seeds in a circle, and put the foot on them. Do this about every five yards, protect the plants from rabbits, and leave Nature to do the rest until they are matured. Sheep eat them very readily when once they get used to them. They can be carted to an open shed, laid on a little straw, and will keep for a long time if carefully stored. Maize, sorghum, and millets do best on a good loam with a They will also do well on our rich, black soils in good moist sum-The land should be ploughed early and deep, be well cultivated and harrowed to conserve moisture; they being entirely summer crops. For manure use 1cwt. of super. and 1cwt. of bonedust per acre. A portion of this should be applied before the seed is sown. Sowing should be done about the end of Septemaccording to the season. For maize, I prefer Horse Tooth and It is best sown in drills 3ft. apart, so that the Planet Junior cultiber or October, according to the season. Hickory King. vator can be used. If sown 3ft. apart 20lbs. of seed will be sufficient for an acre. If broadcasted, more seed is required. Sorghum.—I prefer Amber Cane and Saccharatum. If sown in drills 2ft. apart use 4lbs. or 5lbs. per acre; if broadcasted, Seed might be soaked for 48 hours in cold water before sowing. 6lbs. or 8lbs. Millets.—I prefer Pearl and Japanese. The former I have found to give much more feed per acre, but all stock prefer the latter. If sown in drills 2ft. apart use 4lbs. per acre; more if sown broadcast. The sowing of maize, sorghum, and millets can be done with the ordinary drill, similar to mangolds. Just a few words on the value of forage crops for farm animals. I think we all know, or should know, how they appreciate early green feed, such as wheat, oats, &c. It is very useful, in fact, indispensable, to the milking cows, young foals, ewes and lambs; in fact, every animal on the farm. Mustard is somewhat different. It is not the best for milking cows, but is very useful for ewes and lambs. Kale and chou moellier, &c., if sown in autumn, provide good early winter feed, and if sown in August provide good feed for early summer. They are useful for all stock on the Peas can be fed in the field when ripe, to sheep or pigs. They can be fed in the haulms or may be threshed and cleaned, and fed as grain. They are very fattening for sheep, lambs, pigs, and horses. Vetches are best sown mixed with fattening for sheep, lambs, pigs, and horses. early green feed, and can in that way be fed off by stock, or they can be cut for green feed as required, and in spring, when feed is plentiful, I understand, it is a good mixture for ensilage. Mangolds and sugar beet are very much relished by milking cows, and make a very good ration in the winter months if sliced and mixed with good straw chaff. They also make very good feed for pigs and poultry. Turnips can be grazed by sheep, or be fed to sheep and cows similarly to mangolds. Melons may be fed to sheep, cows, or pigs, as soon as they have reached maturity. For sheep they can be fed in the field about once or twice a week. the melons with a hammer, give a few of them a hit just to knock a piece out, and the sheep will do the rest. For cows they make good autumn and winter feed sliced They are also useful for pigs, but not fattening. and mixed with chaff.

Maize can be cut for cows as melons will keep for months if carefully stored. soon as it has made sufficient growth. Sorghum and millets are best left until the seed commences to form. Sorghum in particular is always liable to cause a poisonous gas in cows if fed before it goes to seed. These crops can, I believe, be conserved for good winter feed by putting down alternate layers of straw, maize, sorghum or millet, and I understand this makes a good stand-by for lean years. 1 have just briefly tried to explain the value of forage crops to stock and how to use them. Soil Improvement.—Let us now see how they affect the soil. In the case of early green feed, such as wheat, oats, &c., if simply cut and fed to stock, I certainly fail to see that it improves the soil, but if it is grazed and ploughed in at the end of winter or early spring it certainly improves it, there being an increase of humus, while the excreta of the stock both liquid and solid, will be con-If vetches have been included in the green feed, then a fair amount of nitrogen will be conserved for the following crop. Mustard has no special value as a soil renovator in itself, excepting by providing humus, but if fed to ewes and lambs the mustard is converted into manure, both liquid and solid, and left directly on the field. When mustard is fed off for the last time it should be fed very close, and then ploughed. If the land is suitable it will be in good heart for a potato crop. As kale, &c., usually last for several years, and carries a lot of stock for that period, the land will generally be found in fair order for a cereal crop. Peas, on account of gathering a quantity of nitrogen, and storing it in the soil, leave it in good condition for early green feed, hay crops, and others. Mangolds, etc., require heavy manuring and are deep-rooted, hence they certainly pave the way for any of the cabbage family. Pie Melons .- I very much doubt if these have any beneficial effects upon the soil. Maize, &c .- In dry districts these plants can have no beneficial effects upon the soil, but in our own district, which generally has a heavy rainfall it has been found in a number of instances that wheat following maize gave better returns than bare fallow. The reasons for this I cannot explain, excepting where maize, &c., has been heavily manured. In conclusion, you will note that I have made no mention of lucerne. While I confess that this can be grown fairly well in a few patches, to be grown successfully it must be grown under irrigation, and that I consider is a subject by itself. Mr. Wray believed that farmers in the South-East would have to depend more upon forage crops for the successful utilisation of the land than to anything else. In reply to questions, Mr. Schinckel said he had experience with over 200 varieties of oats, and he had found that Cape did the best in this district for green feed. It was sweet and succulent. In the growth of barley for green feed they had to be careful in its Mr. Loller strongly recultivation, because it was the most delicate of cereals. commended Medea and Indian Runner wheats for green feed. Mr. Wray had heard Professor Lowrie recommend Dun oats for green feed. Though it was a slow grower it gave better fattening results. The Chairman said he had experience with Dun oats at Kybybolite, and they had done fairly well.

NARACOORTE (Average annual rainfall, 22.60in.).
July 17th.

Pruning Demonstration.—Mr. A. Johnstone, of Naracoorte, gave a most interesting and practical demonstration on the pruning of fruit trees at the homestead of Mr. J. J. Donohue, Messaniurry Road. A representative gathering of members and friends were assembled when Mr. Johnstone proceeded to operate on the first tree. The treatment of apple, pear, plum, peach, apricot, and other trees was illustrated, and the demonstrator explained the various methods of pruning, also how to distinguish the fruiting from the wood buds, and the outstanding features of cellular, fibrous, fruiting, and non-fruiting laterals and spurs, watershoots, &c. Not only did Mr. Johnstone show where and how to prune, but also gave illustrations where not to prune the various trees. At the conclusion of the demonstration Mrs. Donohue invited the assemblage to partake of afternoon tea.

NARACOORTE, August 11.—The Superintendent of Experimental Work (Mr. W. J. Spafford) addressed the meeting, and answered a number of questions put by members.

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

Vinegrowers' Manual, by A. Sutherland, 6d.; posted, 7d.

Reports of Conferences of Australasian Fruitgrowers held at Brisbane and Wellington, 1s. each, or 1s. 1d. if posted.

Journal of Department of Agriculture of South Australia, 1s. per annum, in advance; 3d. per single copy to residents of South Australia; 2s. 6d. per annum to other places.

Quinn's Pruning Book. A handbook for Fruit and Vine Growers; price, 2s. 6d.; posted, 2s. 8d.

Any of the following Bulletins and Leaflets may be obtained by sending a penny stamp for postage:—

Agriculture, Miscellaneous: Agricultural Bureau Congress Reports;
Amount of Spirits to be Extracted from a Ton of Raisins; Depth of Sowing of some Agricultural Seeds; Digestibility and Handling of Wheaten Hay; Dry-Farming Conference Reports; Feeding-Off Experiments with Sheep; Housebuilding in New Districts; Irish Potato Blight; Lucerne Cultivation and Management; Lucerne Leaf-Spot Disease; Milling Experiments; Reclamation of Land; Roseworthy College Farm Flocks; Roseworthy College Harvest Reports; Roseworthy College Experimental Field Reports; Sheep on the Farm; Spraying against Potato Blight; Stage to Cut Wheaten Hay; Trial of Stone-Gathering Machines.

Horticulture: Banded Pumpkin Beetle; Bordeaux Mixture; Curculio Beetle; Codlin Moth; Currant Industry; Fertilisation of Orchard Lands; Fruit Drying; Fruit Flies; Fruit Preserving; Grape Vine Mildews; Gumming Disease of Peach and Almond Trees; Selection and Planting of Fruit Trees; Peach Leaf Curl Fungus; Plums and Prunes; Preserving, Canning, and Drying of Fruits; Production of Early Tomatoes; Remedies for Diseases of Fruit Trees and Vines; Some Notes on Almonds.

Dairy: Milking of Cows; Spaying of Cows; Taints and Flavors of Dairy Produce; Taints in Milk and its Product; Testing Milk and Cream

Stock: Branding of Stock; Bot Flies and Bots; Castration of Colts and Spaying of Cows.

Poultry: Diseases of Poultry; Parasites of Poultry; Poultry Tick; Reports of the Egg-Laying Competitions; Single Testing for Egg Production.

Beekeeping Notes.

[Every farmer and fruitgrower should join the Agricultural Bureau. Write to Department of Agriculture for particulars.]

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Conference at Clarendon.

The annual conference of Hills Branches of the Agricultural Bureau will be held at Clarendon on Thursday, October 21st. The official speakers will be Mr. Geo. Quinn (Horticultural Instructor), Mr. F. E. Place, B.V.Sc., M.R.C.V.S. (Veterinary Lecturer), and Mr. P. H. Suter (Dairy Expert). The first session commences at 10.30 a.m., and the conference will be continued during the afternoon and evening.

As usual, the meetings will be open to the general public, and it is anticipated that a large number of the members of the Bureau will foregather at Clarendon.

Sorghum as a Summer Fodder for the Upper North.

In reply to an inquiry regarding the growth of sorghum as a summer fodder, from the Arden Vale and Wyacca Branch of the Agricultural Bureau, the Director of Agriculture said:-If the crop can be irrigated I recommend sorghum very strongly. sown sufficiently early, you should be able to take two or three good cuts from it during the course of the season; and, in exceptional cases, a fourth autumn cut or grazing. Without irrigation very much will depend in your district on the nature of the summer; if occasional thunderstorms occur the crop may be very good; if the summer is very dry, the reverse will be the case. If the crop can be irrigated, assuming the land to be suitably prepared, sow some time during the present month (September). If you can do so, dress the land with as much farmyard manure as you can collect. Work the land to a fine state of tilth and drill the seed in mixture with bonedust (3cwt. to acre) at the rate of 8lbs. of seed to the acre, in rows about 32in. apart. Run a roller over after the drill; this will promote early ger-As soon as plants are sufficiently advanced run a horse hoe between the rows to loosen the soil and open out irrigation channels. Apply water, in alternate rows, as soon as the plants show any need Generally speaking, three irrigations will suffice during the of it. If grown without irrigation, you may still sow during the present month if the land is sufficiently moist to bring about immediate germination. If not, I think it on the whole wiser to have

the seed and land ready to sow immediately after a heavy rain, should the latter come along. You may sow any time during summer months, even as late as January, after a heavy thunderstorm. If not irrigated, sow at rate of 6lbs. to acre in the same way as already indicated; also roll after sowing, and keep the surface soil loose by cultivating after every rain. Do not feed or cut the crop until the heads are showing. As to varieties, early Amber Cane is among the best; Sorghum Saccharatum is also good. For irrigation you might test Japanese millet at the rate of 2lbs. to the acre.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh. dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious pneumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days, whilst that officer is away in the country.

Horses at Harvest Time.

Long working hours and irregular feeding and watering, especially when the intervals between meals are unduly long, are the most prolific causes of the worst forms of colic in horses, namely, spasmodic colic and twisted gut. This is why so many horses go wrong at harvest time. The remedy is a simple one; regulate the teams' work so that not more than four hours elapse without a rest for feeding; water before feeding; allow at least an hour for digestion, and go steady during the first hour's work. An idle horse in the team ensures the health of the rest much better than a stock of colic drenches.—
Fras. Evellyn Place.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

Replies by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary

"M.G.C.," Coward Springs, has a horse with fistulous withers. He has been syringing the wound twice daily with hot water, and injecting a mixture of Stockholm tar, linseed oil, flowers of sulphur, and carbolic acid.

Reply—The treatment so far has been all right, but as there is always diseased tissue at the bottom of the fistula or pipe, it has to be removed, and may be cut down on to without risk, as the vessels in the neighborhood are not large, and may be twisted with the artery forceps if accidentally cut. The diseased tissue, either bone or cartilage, will probably be blackish, and must be scraped out. The after treatment is to irrigate freely with cold water either by means of a hose for an hour or so a day, or, if this is not practicable, hang up a kerosine tin with a bit of plough line through the bottom long enough to reach the withers, and fray it out over the wound. If it commences to heal satisfactorily in about a fortnight, continue the treatment, but dust afterwards with boracic acid or dress with spirit of iodine. In opening out the fistula do not be afraid to use the knife freely.

- "F.D.," Kooringa, who also asks for treatment for fistulous wither, is referred to the above.
- "D.R.," Kalyan Siding, states that a mare was staked under the shoulder. There was apparently nothing left in the wound, but body became much swollen with what felt like air.

Reply—The movement of the leg after the stake pumped the air into the cellular tissue under the skin, and it certainly looks alarming, but will gradually be absorbed, and is not serious. If it is certain that nothing is left in the wound it may be treated as an ordinary puncture and dressed twice a day with spirit of iodine, and will probably soon be well; but if it happens that anything is still in, there will be a chronic discharge until it is removed.

"A.F.H.," Lochiel, reports a horse with a swelling of the gland on the offside of the neck.

Reply—The swelling is an enlarged thyroid gland, and it would be well to let the mare have a pint of limewater every day in feed, or to give her a handful of bone meal once a day. Reduction might follow a daily rubbing in of a little blue mercurial ointment; this treatment should be carried on for about three weeks, when a further report would be esteemed. The mare may be worked as usual during treatment.

"S.McC.," Colton, reports that a stallion has a swelling on the shoulders and neck, due probably to a kick.

Reply—By the time the reply is received there is every possibility that the swelling will be decreasing or softening and running under the breast; it is probable that the kick injured the large jugular vein. Hot fomentations were the best treatment and probably no other will be required. If, however, the swelling persists, bathe twice a day with a lotion of Hamamelis extract 1 part, methylated spirits 5 parts.

"H.H." asks for treatment for a blown horse.

Reply—The most satisfactory drug for a blown horse is ammonia, which may be given as a teaspoonful of ordinary cloudy ammonia in a little cold water or as a teaspoonful of carbonate, either as a ball or mixed with molasses and smeared on the teeth. The animal should also have the hind bowel cleared by hand (back-raked), and enemas of warm, soapy water; the flanks should be well rubbed. A stimulant, such as half a pint of gin, with 20 to 30 drops of essence of peppermint and half a pint of warm water. For fuller detail see Agricultural Journal, April, 1915, "Digestive Diseases of the Horse."

"M.J.C.," Booleroo Centre, reports that a mare was kicked on the inside of the hock, and is now very lame, and has a constantly running sore.

Reply—Most probably Synovitis and inflammation of the joint exists, and it will be very difficult for an amateur to treat. If the mare is valuable it would be well to put her in the hands of a qualified veterinary surgeon for treatment. In the meantime dress twice daily with spirit of iodine.

"M. Bros.," Lameroo, report that a mare has pain and swelling of belly before foaling.

Reply—There appears to be displacement or twist, and probably before this reply is received the mare will have settled the question during her struggles. If, however, she does foal, 10 drops of tineture pulsatilla morning and evening for a few days will do her good.

"D.H.L.," Auburn, reports horses lame in front, with coronets swollen and hot.

Reply—The condition is villitis, arising very probably from the feed; it is nearly akin to laminitis or founder. It would be well to put the animals on poorer feed, and rub lemon juice into the coronets once a day. This treatment is generally satisfactory.

"J.R.," Salt Creek, asks for treatment for a horse with hoofs that are splitting.

Reply—The following is a useful dressing for such a condition, and should be brushed into the hoof daily:—Stockholm tar and mutton fat in equal quantities warmed, with sufficient castor oil to bring the mass to a pasty consistency.

"P.R.P.," Bendleby, reports a lump on the side of the face of a colt. The lump is hard, and apparently containing bone.

Reply—The enlargement is probably a bone disease called osteo malacia, connected with malnutrition during growth, and it is not probable that recovery will take place. Treatment—Rub in daily a little blue mercurial ointment, and give twice a day on the tongue a table-spoonful of syrup of phosphate of iron. The treatment should be continued for a month, but if no improvement is then apparent, it would be useless to go on with it.

"S.E.," Georgetown, has a yearling foal which is troubled with worms; stiff, drowsy.

Reply—The worms were the ordinary round worm, Ascaris megalo cephala, which are often so numerous in the small bowels of yearlings that actual poisoning occurs from the waste of the worms. Half a teacup of castor oil with half a pint of warm milk given as a drench, say once a week for a while, will do good. The writer is not a believer in dosing horses that are apparently well, but in the case of worm-infested animals a tablespoonful (adult dose) of the following mixture once a day in the food is often followed by good results:—Equal parts of sulphur, sulphate of iron, saltpetre, sulphate of magnesia, black antimony, and salt, with twice the weight of the lot of linseed meal. Fowler's solution of arsenic is more suited to bloodworms than to these, but as both are probably present, it may be given as well if desired.

Inquiries relating to worms in horses and disorders arising therefrom. were also received from "A.B.C.," Wirrabara; "D.H.," Port Broughton; "J.V.K.," Wilson; Naracoorte Agricultural Bureau; "P. Bros.," Stirling North; "M. Bros.," Sandy Creek; "J.R.H.," Watervale; "F.W.," Angaston; "H.L.W.," Port Augusta; "J.G.," Boolcunda East.

"J.McN.," Moockra, has (a) an eight-year-old gelding which keeps on stamping its feet, and at times kicks violently; its eyes are liverish; (b) an 11-year-old gelding which goes lame periodically, in hind fetlock apparently.

Reply—(a) The stamping is most likely due to parasites. Rub the legs each evening with benzine 1 part, olive oil 5 parts. Give twice a day in food for a week a flat tablespoon of sulphur. Berg oil being an antiseptic is useful in coughs and colic, and so forth, but has no special advantages over Stockholm tar. (b) From the description it is likely that there is kidney trouble. Should the lameness recur, try 10 drops of tincture of camphor on the tongue morning and evening for a week.

"J.H.T.," Laura, seeks treatment for a lump in the teat of a cow.

Reply—The best thing would be to cut out the growth with a special instrument called a bistource cache; but, failing this, continue to pass the syphon. After operation a little solution of boracic acid should be injected up the teat; a teaspoonful to a pint of warm water.

"D.E. McL.," Robe, has a draught stallion which has lost condition; with soft, pasty swellings. He drenched the animal with half a pint of linseed oil.

Reply—If a strong horse, the linseed oil may not hurt him, but it is not good treatment in this condition, which is a form of influenza, possibly contracted from a mare that did not show any definite symptom. A teaspoonful of saltpetre twice a day for a few days in light feed such as bran will do good; the swellings will soften and disappear. The horse should not be put to service till some days after the symptoms have subsided.

"R.F.M.," Taplan, reports the death of a mare. The lips were discolored, she had great difficulty in breathing. Death was speedy but painful.

Reply—Probably Purpura haemorrhagica, a severe form of blood poisoning; but the symptoms also point to poisoning by a weed such as euphorbium, which is the more probable; this would produce the lesions on the lips and tongue.

"W.M.H.," Redhill, reports a horse's penis swollen from injury by a rope three months previously.

Reply—Apply daily tineture arnica loz. to olive oil 1 pint, but after such lapse of time the injury may be permanent.

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Reply—Apply daily tineture arnica loz. to olive oil 1 pint, but after such lapse of time the injury may be permanent.

"M.B. & A.," Carpa, state that the right jawbone of a four-year-old gelding is enlarged and hard, with smaller soft swellings nearer the throat; they desire to know the cause and treatment.

Reply—Probably the result of abscesses arising from grass seeds. It would be well to open the softer ones and rub into them and the hard one blue mercurial ointment daily. The effect will be better if the swellings are fomented with hot water first; as much ointment as will be absorbed should be rubbed in. If the bone is really involved that swelling will remain.

"J.P.," Green's Plains West, had a cow which calved on September 12th; went on all right for a time, then became very stiff.

Reply—Possibly tetanus, which sometimes follows calving; let her have 4ozs. of Epsom salts a day in bran for a few days.

"J.J.G.," Spalding, asks treatment for a gelding staked inside hock. Reply—Dress twice daily with spirit of iodine, and after the wound has healed, with Stockholm tar.

"E.R.K.," Maitland, has a draught colt troubled with puffy hocks: he desires to know what would reduce the condition within three weeks. He also reports occurrence of fat in bag with newborn foal.

Reply—Nothing much can be done in three weeks, but a quarter of an hour hand rubbing daily will help; a little olive oil and arnica, 20—1, may be used as well. The material referred to was hippomanes, a glandular structure concerned in development; it was not normal in appearance.

"P.H.J.," Pinnaroo, had a four-year-old-mare which suffered inversion of the womb, but recovered. He asks whether to put the mare to the horse this season.

Reply—As the mare is only four, it would probably be better to let her miss this year after the accident, but if it is particularly desired to breed from her she may be tried the second heat after all symptoms of inflammation have subsided.

W.F.H.," Cleve, asks the better age at which to castrate colts—one year, or two years.

Reply—Probably one year is a better age than two, as at the latter any check to the growth leaves a low wither; but from a practical standpoint any age will do, and the younger the colt is the less he feels the loss. The longer he is left the more staggy his growth.

"C.A.H.," Buccleugh, states that a pony gelding, aged, was noticed in paddock very distressed; the heart beats moving the whole body; mucous membranes, bluish grey; died. P.M.—Organs apparently all right, except big blood clot at base of neck and yellowish jelly on bowels

Reply—The yellow material round the bowels was the work of microscopic worms, and the blood clot was probably also due to them, as a thrombus had formed which produced the heart symptoms. Treatment would have been useless, and a similar case is not likely to occur again. If it did, 10 drops of tineture digitalis every half-hour for three hours might relieve.

"H.R.M.," Moorlands, has a gelding 13 years, with a hard swelling on the sheath; otherwise in good health. He desires to know the cause and cure.

Reply—If the horse is a grey it is a form of tumor; if of other color it may be an enlarged gland, in which case try rubbing it daily with a little blue mercurial ointment.

"C.H.C.," Wirrabara, reports that a mare, after being shod, had an attack of staggers, from which she gradually recovered. He asks whether another attack is likely.

Reply—It does not necessarily follow that the mare will have a repetition of the attack, which probably followed some accident such as striking the head when rearing in the forge, the history of which is not added. Blind staggers is a name given to congestion of the brain or its coverings, and is frequently connected with digestive derangements. A good dose of purgative medicine is the usual treatment.

"G.P.B.," Kadina, reports that a sow is stiff in the hind quarters; has difficulty in rising.

Reply—The trouble is probably worms, and as she is in pig it is not advisable to give the usual treatment of 2ozs. crushed castor oil beans. Instead, give her in a little milk or meal twice a day 10 drops tincture nux vomica, and continue for a month if necessary. Also give cinders regularly in one feed a day. Rubbing the back with a hard brush will also help.

"D.A.D.," Ucolta, has pigs which do not thrive, and suffer from itch.

Reply—Probably lice and mange; if the former, they look like ticks, and can be found about the ears and eyes. The treatment is the same for both conditions. Give a heaped teaspoonful of sulphur in milk to each pig once a day for a week. Also feed cinders in one daily meal. Spray or scrub with some non-poisonous sheep dip, and oil all over afterwards; repeat this treatment in three days, and again in a fortnight. Water that potatoes have been boiled in is also good as a wash. Disinfect the houses with boiling water and limewash with 20zs. carbolic acid to the gallon.

"F.R.," Forest Range, has a cow which has not cleaned after calving. Reply—Full directions for treatment have frequently been given in the *Journal of Agriculture* (see lecture by the writer on diseases of

cattle). If the cow has not cleaned by the time the reply is received take a split stick and fix the cleaning in it, twist it round up to the bearing, and, well greasing the hand and arm, follow the cleaning till the buttons or cotyledons are felt; squeeze these between two fingers, and keep a steady but not too strong strain on the stick, winding till all cleaning is removed. Syringe out with a kerosine can of hot water, in which as much Condy's crystals as will lie on a sixpence have been dissolved if the cleaning smells badly. If the cow strains, tie a rope tight round her belly till the straining ceases. Three-quarters of a pound Epsom salts and ‡oz. ginger in a quart of gruel as a drench will probably do good.

"S.O.," Penola, has a cow giving clotted milk; he asks cause and treatment, and also the best substitute for milk for feeding calves.

Reply—The result of inflammation of the udder, and the milk should not be used. Foment the udder well with hot soapsuds after milking twice a day, and inject half a teacup of lotion made of a pinch of boracic acid to a cupful of warm water into each teat every few days for a few times. Any good proprietary calf meal is a substitute for milk; Bibby's has a great reputation both in England and New Zealand. If calf meal is unobtainable, mixtures such as that suggested in these replies will do, or skim milk with a little boiled linseed and peameal, say, 20zs. of each per calf.

"S.J.B.," Ungarra, reports the death of four cows, from nine days to six weeks after calving. They became stiff, developed a cough, and great pain; was followed by death.

Reply—Following so soon after calving one is inclined to suspect tetanus. Should others be taken ill it would be advisable to communicate direct without delay with the Chief Inspector of Stock, Adelaide, who would send an officer to investigate and advise.

"H. B." has a filly with hip knocked down through accident.

Reply—It is more than probable that there is a fracture of a bone, and interference would do more harm than good. It is quite possible that Nature will restore the damage if given sufficient time. If the filly is over two, she might carry a foal while mending.

"A. H.," Kulde, had a filly drop dead. Post mortem, white spots on lungs.

Reply—The filly had suffered from inward strangles, which left the abscesses in the lungs.

"W. F.," Hawker, asks for treatment for a cow which retained afterbirth.

Reply—It is not well to hang a weight on, because putrefaction occurs. On several occasions full details have been given of treatment. In the present case it would be well to syringe out the womb with a bucketful of warm water, in which as much Condy's crystals as will lie on a sixpence have been dissolved. Also put on her tongue twice daily 10 drops of tinct. pulsatilla for a week.

"R. B.," Millicent, has a draught colt, two years, suffering from paraphymosis.

Reply—Bathe the organ with cold water, smear with camphor ointment and sling to belly. Give a dessertspoon of Fowler's solution of arsenic once a day for a fortnight.

"E. F.," Burra, has a colt which bled excessively after castration, and lost its sight.

Reply—The standing in water is a good thing, and the sight will probably be restored if the colt is given a tablespoonful of syrup of phosphate of iron on the tongue twice a day for a week or ten days.

"W. M. H.," Tumby Bay, reports a horse with fistulous wither.

Reply—An operation is necessary to remove dead tissue; until this is done nothing will help; afterwards irrigate for an hour daily with cold water, and healing will probably take place in three or four weeks.

"G. D. O.," Balaklava, reports horses troubled with cough.

Reply—The cough is probably connected with a specific fever, such as strangles or influenza. Continue the bran and boiled linseed, and give daily from a dessertspoon to a tablespoon, according to age, of the following powder:—A quarter of a pound each sulphur, saltpetre, sulphate of iron, aconite leaves, liquorice, and gentian, mixed with a pound each of sugar and linseed meal. Rubbing embrocation into the throat will also be of use. In the case of horses up to five years cough often arises from cutting teeth.

A member of the Monarto Agricultural Bureau has a cow difficult to milk, which he desires to dry off.

Reply—All that is necessary to dry her off is to let her alone, just easing the udder every few days if uncomfortable. Some people rub in extract of belladonna occasionally.

"J. R.," Glencoe, has a mare which is troubled with bleeding from bearing.

Reply—The mare may probably be served safely; the discharge is probably only local. Try 10 drops tr. arnica on tongue morning and evening for a fortnight.

"J. G.," Clare, reports a filly as being stiff, with joints enlarged.

Reply—Apparently rickets, and probably it will not pay to treat the animal. But, if desired, give a tablespoonful of syrup of phosphate of iron on the tongue twice a day, and a good handful of bone dust once a day in the feed; treat for a month.

"T. B.," Parilla Well, reports the loss of cattle, which became stiff, restless, loss of cud. *Post mortem* revealed congestion of liver and enlarged gall bladder.

Reply—Dry bible, or berri berri, or diet deficiency disease, are names given to the condition described, which arises, not from actuat shortage of food, but of want of certan elements called vitamines. As preventive change food as often as possible; give a liek of three parts bonemeal and one part saltpetre. Treatment—A pint of yeast once a day till cud is restored, and two tablespoons of syrup of phosphate of iron twice or three times a day, either on the tongue or in gruel as a drench.

BACON CURING.

"A. P.," Naracoorte, asks for a method of curing a 300lb. pig for bacon.

The Dairy Expert says, in reply—This size pig is rather large to make a good-quality bacon, as there is not a nice even distribution of fat and lean. The old idea of stating a given quantity of each of the ingredients necessary to cure 100lbs. of flesh is rather a crude manner. The amount of salt, &c., absorbed or incorporated into the pork is governed by the temperature, size of pig, and degree of saltiness re-Often when given amounts are stated, the curer, being unfamiliar with the process, hesitates to exceed the quantity, with the result that portions of the flesh become decomposed. The first three or four days is the most critical time in curing. It is an advantage to pump brine into the thicker portions of the flesh; however, if the following instructions are followed the result will probably be satisfactory. Cut the flesh into convenient-sized pieces, and rub well into the flesh side some of the following mixture:—10lbs. salt, 2lbs. brown sugar, 2ozs. saltpetre. Also rub the outside with a piece of board until the rind becomes sticky, which indicates that the pores will allow salt to penetrate; rub thoroughly and for a good while during the first three or four days. After rubbing all the pieces, stack them, sprink-

ling some of the mixture between each layer. For the first four days place them with the flesh downwards. Collect the brine that draws away, but do not use this brine until after four days have elapsed, when it may be poured over the flesh; continue rubbing daily until the ninth day, and then lightly every second day, until the end of four weeks, when the pork should be cured. To ascertain if the salt has penetrated all the thick parts, run a skewer into various points. If the odor of this is similar to that of fresh meat, allow the meat to remain stacked until it loses this odor. When stacking place the portions formerly on top at the bottom, and vice versa. Now rub off the salt with a dandy brush, using lukewarm water, to which is added loz, of carbonate of soda to a gallon of water; hang, scrape, and trim flesh, and when dry it is ready to smoke. Keep a smoke never higher than 80 degrees temperature continuously playing on the flesh. damp the material used for smoking, as this causes moulds. Flesh not properly dry when smoked, or insufficiently cured pork will also cause mould. It is an advantage with large pigs like this to cut out the hip and shoulder joints. If slightly discolored bacon is not objected to, use 20zs, ground allspice in conjunction with salt, &c., thus imparting a nice flavor.

AGRICULTURAL INQUIRIES.

Replies supplied by Mr. W. J. Spafford, Superintendent of Experiments.

The Bowhill Branch of the Agricultural Bureau forwarded some wheat plants affected by disease, and requested information in respect thereto.

Reply—The wheat plants sent by you were submitted to Professor Osborn for an opinion on the trouble affecting them, and he found three fungi that work to the detriment of the wheat—(1) Septoria tritici, causing patches on the leaves; but this is not of much importance, as the damage done is small. (2) Ophiobolus graminis, or "take-all" fungus. (3) Urocystis occulta, the "flag smut," or what is sometimes incorrectly known as "black rust." As the spores of the latter two diseases do not as a rule collect on the grain harvested, no treatment of the seed to be sown will be at all effective in the prevention or even reduction of the trouble; indeed, no remedial measures for the stamping out of either of these diseases can be taken once they have appeared; so it becomes a matter of prevention. If possible, the straw left in affected fields should be burnt, as the spores of the "flag smut" and Mycelium and spores of the "take-all" can live in a dry condition in the soil, and are liable to be scattered about in the

Oats are rarely liable, and then only but little, to the attacks of "take-all," so this crop, by taking the place of wheat on affected land, will help to starve out this disease. Also as bad mechanical condition of the soil favors "take-all," great care will be necessary in the preparation of the seed bed for wheat in affected soil. An ideal seed bed for wheat is obtained by ploughing up the soil and then working it down, so that the immediate surface is fine and loose, and all below it well compacted together. The main fault with the seed bed so often seen in this State, and the one that encourages the activities of the "take-all" fungus, is that it is too loose below the surface; the roots of the wheat plant come to the comparatively large air spaces in the soil, and the plant gets a check just when the fungus is most active. If rains sufficiently heavy to compact the under surface of the soil before seeding operations do not fall, rollers should be used to But in any case, once land is affected, the thing within the reach of all is the growing of oats on that land for a couple of years before it again comes under a wheat crop.

SUDAN GRASS.

The Spalding Branch of the Agricultural Bureau asks for information relating to Sudan grass.

Reply—Sudan grass is purely a warm weather plant, and as such should not be sown until the soil has warmed up; if this precaution is not followed, a poor germination will be the result. As your soils have passed the "cold" stage, now is the time to plant Sudan grass, and the sowing could be continued, say, till the end of October. your district this crop is most likely to be successful if sown in rows, and cultivated with a horse hoe between the rows during its growth. The simplest way of sowing such seed in rows on the ordinary Australian farm is with the seed drill, only allowing the seed to be distributed from every third or fourth hoe. To do this remove the manure star over the hoes, from which it is not intended to run seed, and drop big-headed rivets or short bolts in their places; mix the seed with a fertiliser, preferably bonedust, and drill in the ordinary way. Sown in rows in this manner you will need from 3lbs. to 6lbs. of seed to the acre; if you prefer broadcasting 10lbs. to 14lbs. of seed will be necessary. The seed bed for this class of crop should be a firm one, and nice and fine on the immediate surface; this is obtained by ploughing and then working down with roller and harrows. careful that the seed is not put in too deeply—from lin. to 11 in. is quite deep enough. As this crop is a strong grower, the better the soil the bigger the crop.

"E. E. R.," West Wagin, asks whether "stinkwort" will deleteriously affect land for cereal growing.

Reply—"Stinkwort" has no injurious effect on land for cereal growing; it very likely has a beneficial effect, because of its deeprooting habit. It is, of course, a rather bad weed on a farm, as it is not eaten readily by stock, and is hard to kill with ordinary methods when once allowed to become any size. For all this, with ordinary care it does not give much trouble after ploughing has been completed if the recognised rules for working bare fallow are followed.

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of September, 1915, 7,152bush. of fresh fruits, 14,914bush. of bananas, 17,636 bags of potatoes, 1,414 bags of onions, 20 packages vegetables, and 151 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 146bush. of bananas (over ripe) were destroyed. Under the Federal Commerce Act 850 cases of fresh fruits, 160 packages of dried fruits, and 1 package of plants were exported to oversea markets during the same period. These were distributed as follows:—For London, 60 packages dried fruits and 1 package of plants; for New Zealand, 850 cases citrus fruit and 100 cases dried fruit. Under the Federal Quarantine Act, 1,806 packages of seeds, plants, and bulbs, etc., were examined and admitted from oversea markets. Of these, 1 packet of Japanese clover was ordered to be destroyed or returned, on account of the presence of weed seeds.

THE EQUIVALENCE OF LIVESTOCK FOODSTUFFS AND FEEDING RATIONS.

By ARTHUR J. PERKINS, Director of Agriculture.

(Continued from page 157.)

THE PRACTICAL SIGNIFICANCE OF "STARCH EQUIVALENTS."

I have shown that what is termed the "starch equivalent" of any foodstuff is the number of pounds of pure starch to which, for feeding purposes, 100lbs. of this foodstuff is equivalent. Thus it has already been shown in detail that 100lbs. of wheaten hay corresponds to 30.9lbs. of starch; 100lbs. of bran to 45.3lbs. of starch; and 100lbs. of cocoanut oil cake to 84.2lbs. of starch. These figures represent the starch equivalents of these several foodstuffs, and from tables that have already been given the starch equivalents of other foodstuffs in current local use can easily be determined. Hence, it follows that we have here a definite basis on which all foodstuffs, however diverse their nature, may for feeding purposes be compared one with another.

In everyday practice there are two ways in which a knowledge of foodstuff equivalence may be put to practical advantage: (1) To determine which of two or more interchangeable foodstuffs is the cheapest at current market rates, and (2) to build up from more or less unfamiliar foodstuffs suitable feeding rations.

THE CURRENT MARKET PRICES OF FOODSTUFFS AND THEIR FEEDING VALUE PRICES.

We are all probably aware that the current market price of a food-stuff is not necessarily a correct measure of its relative feeding value. Doubtless, on a market stocked up to normal requirements, the better-known foodstuffs tend to find the level of their true feeding value; in ordinary circumstances, however, much depends on the abundance or shortage of supplies; and much, too, on fashion, and use and wont. Rightly or wrongly, here in South Australia we have made wheaten hay chaff the great staple foodstuff for all our livestock, with the natural exception of pigs; and whilst in normal seasons the practice may be more or less economically defensible, it is unquestionable but that in 1914-15 fashion had an unwarantable grip of us, when we fed chaff at £12 a ton, to the exclusion of apparently more costly but relatively cheaper foodstuffs. The position may be illustrated by the

statement that with wheaten hay chaff at £12 a ton, the "feeding value" price at the same rate should have been 3s. 2d. a bushel for bran, 8s. 3d. a bushel for oats, and 10s. 5d. a bushel for feed barley—prices which we all know were never even approached, even in the barest stages of the market.

For purposes of general comparison, and in order to enable users to contrast the current market prices of foodstuffs with their "feeding value" prices, I have summarised in Table XIV. the "feeding value" prices of foodstuffs relatively to both wheaten hay chaff and to wheat at usual current local rates. I have chosen wheaten hay chaff and wheat respectivly as standards, because, in ordinary circumstances, these two commodities practically settle the local prices of livestock foodstuffs, and generally independently one of the other.

Table XIV.—Showing Comparative Food Value Prices of various Foodstuffs relatively to Wheaten Hay Chaff and to Wheat at usual Current Rates.

The date of	JJ		es Corre			Values Corresponding to Wheat at			
Foodstuffs.	Unit.	£2	£3	£4	£5	3/6	4/-	4/6	5/-
Roots-	Ome,	ندرل	,100	J. T	20	3/0	4/-	±/0	<i>0</i> /-
Carrots	Ton	11/3	16/11	22/7	28/2	15/6	17/9	20 /-	22/2
Mangolds	"	8/2	12/3	16/4	20/5	11/3	12/10		16/1
Potatoes	66	24/7	36/11	49/2					48/5
Swedes	44	9/9	14/7	19/5	24/3	13/5	15/4		19/2
Turnips	44	5/11	8/11	11/11	14/11	8/3	9/5	10/7	11/9
Green Forage, &c		,	,	,	,	,	,	•	•
Oats (early growth)	Ton	11/-	16/6	22/-	27/6	15/2	17/4	19/6	21/8
Oats (in bloom)	44	12/11	19/5	25/11	32/4	17/10	20/5	22/11	25/6
Barley (early growth)	**	12/5	18/8	24/10	31/1	17/2	19/7		24/6
Barley (in head)	**	20/8	31/1	41/5	51/9	28/7	32/8		40/10
Rye	44	14/8	22/-	29/3	36/7	20/2	23/1		28/10
Maize	"	11/9	17/8	23/7	29/5	16/3	18/7		23/2
Sorghum		10/6	15/9	21/-	$\frac{26}{3}$	14/5	16/6	18/7	20/8
Italian Rye Grass	"	14/9	$\frac{22}{2}$	$\frac{29}{6}$	36/11	20/4	23/3	26/2	29/1
Perennial Rye Grass	44	13/9	20/7	27/5	34/4	18/11	21/7	24/4	27/-
Red Clover	24	13/2	19/10	26/5	33/-	18/2	20/10	23/5	26/-
Crimson Clover		11/8	17/6	23/4	29/2	16/1	18/4	20/8	22/11
Lucerne (before bloom)		11/9	17/8	$\frac{23}{7}$	29/5	16/3	18/7	$\frac{20}{11}$	23/2
Lucerne (full bloom)	"	10/10		$\frac{21}{9}$	27/2	15/-	17/1	$\frac{19}{3}$	21/5
Pease (in bloom)		8/7	$\frac{12/10}{12/10}$	$\frac{17}{1}$	$\frac{21}{4}$	11/9 12/8	13/6	$\frac{15/2}{16/3}$	16/10 18/1
Beans (in bloom)		$\frac{9/2}{12/3}$	13/10	24 /7	30 /8	17/-	14/6 19/5	21/10	$\frac{16}{1}$
Sainfoin		9/6	$\frac{18}{5}$ $\frac{14}{2}$	18/11	23/7	13/-	14/11	16/9	18/7
Vetches		12/2	18/3	24/4	30/5	16/9	$\frac{14}{19/2}$	21/7	24/-
Field Cabbage		9/4	14/	18/8	$\frac{30}{3}$	12/10	14/8	16/6	18/4
Rape		9/1	13/7	18/2	$\frac{23}{4}$	12/6	14/3	16/1	17/10
Hays—		0/1	10/1	10/2	22,0	12/0	1110	10/1	11/10
Wheaten hay (full bloom)	. Ton	40/8	61/	81/3	101/7	56/1	64/1	72/1	80 /1
Wheaten hay (standard)		40/-	60/-	80 /-	100/-	55/2	63/-	70/11	78/10
Wheaten hay (overripe)	66	38/4	57/6	76/8	95/10	52/10	60/5	67/11	75/6
Oaten hay (in bloom)		45/7	68/4	91/2	113/11	62/10	71/10	80/9	89/9
Italian Rye Grass hay		46/1	69/2	92/2	115/3	63/7	72/8	81/9	90/10
Red Clover hay	"	41/4	61/11	82/7	103/3	56/11	65/1	73/3	81/4
Lucerne hay (before bloom) .	. "	34/4	51/5	68/7	85/9	47/4	54/1	60/10	67/7
Lucerne hay (in bloom)		29/-	43/6	58/-	72/6	40/-	45/8	51/5	57/1
Pease (in bloom)	. "	36/-	54/	72/-	90/-	49/8	56/9	63/10	70/11
The second secon		•							

Table XIV.—Showing Comparative Food Value Prices of various Foodstuffs relatively to Wheaten Hay Chaff and to Wheat at usual Current Rates.—continued.

Th - 3 4 . C.				respondi lay Cha		Values Corresponding to Wheat at			
Foodstuffs.	Unit	£2	£3	£4	£5	3/6	4/-	4/6	5/-
Grains—						,	,	•	•
Wheat		2/6	3,10		6/4	3/6	4/-	4/6	5/-
Oats	44	1/5	2/1	$^{2/9}$	3/5	1/11	$^{2/2}$	$^{2/5}$	2/8
Barley (malting)		2/-	3/-	4/-	5/-	$^{2/9}$	3/2	3/7	3/11
Barley (Cape)	"	1/9	$^{2/7}$	3/6	4/4	$^{2/5}$	$^{2/9}$	3/1	$\frac{3}{5}$
Rye		$^{2/6}$	3/9	4/11	6/2	3/5	3/11	$\frac{4}{5}$	4/10
Maize	44	2/10		5/8	7/1	3/11	4/5	5/-	5/7
Pease	"	$\frac{2}{5}$	3/7	4/9	5/11	3/3	3/9	$\frac{4}{3}$	4/8
Beans		$\frac{2}{4}$	$\frac{3}{6}$	4/7	$\frac{5/9}{11/7}$	$\frac{3}{2}$	3/8	4/1	4/7
Carob Beans	ewt.	4/8	7/-	9/3	31/7	6/5	7/4	8/3	9/2
Milling By-products—	Darlah	10	m	1/	1/4	10	/10	-/11	1/
Bran	Dusner		-/9 1/	1/- 1/3	1/7	-/9 -/11	-/10 1/	1/2	1/3
Straws and Haulms—		-/8	1/-	1/0	1 / /	-/11	1/	1/~	170
Barley Straw	Ton	24/7	36/11	49/2	61/6	33/11	38/9	43/7	48/5
Oat Straw		22/-	33/-	44/-	55/-	30/4	34/8	39/-	43/4
Wheat Straw	66	14/11	$\frac{33}{4}$	29/9	37/3	20/6	$\frac{23}{6}$	$\frac{26}{5}$	29/4
Rye Straw		13/9	$\frac{20}{7}$	27/5	34/4	18/11	$\frac{21}{7}$	24/4	27/-
Maize Haulms		26/3	$\frac{29}{5}$	52/7	65/8	36/1	41/3	46/5	51/6
Pea Haulms	44	21/-	31/6	12/-	52/6	28/11	33/-	37/2	41/4
Refuse and Oil Cakes—		,	,	,	′	'	,	,	,
Sunlight Oil Cake	ewt.	5/4	8/-	10/8	13/4	7/4	8/5	9/5	10/6
Copra Cake	44	5/5	8/2	10/11	13/8	7/6	8/7	9/8	10/9
Undecorticated Cotton Cake	**	2/6	3/10	5/1	6/4	3/6	4/-	4/6	5/-
Decorticated Cotton Cake	64	4/8	7/-	9/4	11/8	6/5	7/4	8/3	9/2
Linseed Cake	66	4/8	7/-	9/3	11/7	6/5	7/4	8/3	9/2
Palm Nut Cake	44	5/1	7/8	10/2	12/9	7/-	8/	9/-	10/-
Olive Cake	••	3/8	5/6	7/4	9/2	5/-	5/9	6/6	7/2

In Table XIV. I have indicated separately the "feeding value" prices of various foodstuffs, first relatively to wheaten hay chaff at £2, £3, £4, and £5 a ton, and secondly, relatively to wheat at 3s. 6d., 4s., 4s. 6d., and 5s. a bushel. These standards of comparison cover the usual local range of variation in the market prices of both wheaten hay chaff and of wheat. A glance at the table will suffice to show that the ordinary market rates for other types of foodstuffs do not always correspond to their relative "feeding value" prices; and it follows, therefore, that by consulting the table, livestock owners will be in a position to determine whether foodstuffs, interchangeable with either wheat or chaff, can be used with advantage or not.

I have already stated that in good normal seasons ruling market rates for familiar foodstuffs tend to approximate their "feeding value" prices; in abnormal years fashion, unfortunately, appears to control the situation, and favorite foodstuffs soar up to prices altogether out of proportion to those obtaining for unfamiliar or less well-known foodstuffs. A glance at Table XV. below, in which I have contrasted the average ruling market rates for a few typical foodstuffs with their

"feeding value" prices relatively to chaff and wheat, over 1909-10 on the one hand, and 1914-15 on the other, will serve to illustrate the position.

Table XV.—Showing for Seasons 1909-10 and 1914-15 respectively, average ruling Market Rates of typical Foodstiffs contrasted with their "Feeding Value" Prices relatively to Wheaten Hay Chaff and to Wheat.

			1909		•	1914- "Feeding	
			Wheaten		Market	Rela- tively to Wheaten Hay Chaff.	
Foodstuffs.			Cincii.			Chan.	
Wheat Cape Barley Oats Rye Maize Pease Wheaten Hay Chaff Polatoes Mangolds	Ton	3/10 2/6 1/11 3/6 4/- 4/- 60/- 110/- 60/-	3/10 2/7 2/1 3/9 4/3 3/7 	$\begin{array}{c} -2/7 \\ 2/7 \\ 2/1 \\ 3/9 \\ 4/3 \\ 3/7 \\ 60/5 \\ 37/2 \\ 12/4 \end{array}$	7/3 6/- 5/- 8/- 6/- 7/3 180/- 135/- 60/-	11/5 7/10 6/3 11/1 12/9 10/8 — 110/8 36/8	4/11 3/11 7/1 8/1 6/10 114/3 70/3 23/4

We see, therefore, that in a good normal year like 1909-10, in which supplies were abundant, the market price of wheaten hay chaff corresponded exactly, on a "feeding value" basis, to that of wheat. This fact is rather remarkable, in that whilst the market price of wheat is controlled by world factors, that of chaff is usually dominated by the requirements of the Eastern States. It would appear, therefore, that in years of plenty, i.e., years in which the Eastern States are able very largely to meet their own requirements in the matter of chaff, the market price of wheat practically makes that of chaff, and that on a strictly "feeding value" basis.

Further, in the same season, the average market prices of other grains, Cape barley, oats, rye, and maize approximate very closely to their "feeding value" prices relatively to both chaff and wheat. The average market price of Cape barley comes within 3 per cent. of its true "feeding value" price relatively to wheat or chaff; whilst those of oats, rye, and maize come only within 6 per cent. to 8 per cent. And the general inference is that for feeding purposes oats represented the cheapest foodstuff on the market in 1909-10. The fact that Cape barley approached more closely to its "feeding value" price in 1909-10 than any other grains does not necessarily imply any greater popularity as a livestock foodstuff. We have to recollect that good Cape barley is sought after by maltsters for malting pur-

poses, and that their competition must necessarily have an enhancing tendency on average market prices.

In the same season the average market prices of pease, potatoes, and mangolds were above their "feeding value" prices relatively to chaff and wheat. So far as potatoes are concerned, the position is comprehensible, since livestock cannot be expected to be in a position to compete successfully with human beings for their food. Mangolds, on the other hand, at 60s. a ton (mostly water) represent very costly food. It is to be assumed that this price is paid in special circumstances, when a specially succulent foodstuff is in demand. The fact that pease were close upon 12 per cent. above their apparent "feeding value" price will be commented upon in detail later on.

If now we turn to 1914-15 we find complete disorganisation in all prices; to begin with, there is absolutely no connection between the market price of wheat and that of chaff. If gauged as chaff the average market price of wheat should have attained 11s. 5d., i.e., 57 per cent. to 58 per cent. above the actual figure; whilst relatively to wheat, chaff should not have exceeded an average of 114s. 3d., or 36 per cent. to 37 per cent. less than the actual figure.

There are no doubt several good reasons to account for the abnormality of the position. There was in the first place a local shortage of both wheat and chaff; and, moreover, this shortage was probably more pronounced in the case of chaff than of wheat, particularly if we take into consideration the fact that many users, to their loss, stubbornly keep aloof from other suitable livestock foodstuffs, even when chaff attained ridiculous prices. It should not be overlooked, however, that to all intents and purposes, last season the Government, in the interests of drought relief, were the sole buyers of wheat; and that absence of competition had the effect of steadying the price of wheat. Hence we note that barley and oats, whilst 23.4 per cent, and 20 per cent. respectively below their "feeding value" prices relatively to wheaten hay chaff, were 22 per cent. and 27.7 per cent. respectively above their "feeding value" prices relatively to wheat. infer, therefore, that the shortage of livestock foodstuffs was probably more pronounced than that of wheat.

The market price of rye—8s. a bushel—although still below its "feeding value" price relatively to chaff, was probably abnormal under the stimulus of special seed requirements.

Maize, on the other hand—a very unfamiliar foodstuff on the local market—was below its "feeding value" price both relatively to chaff and to wheat.

Potatoes and mangolds, on the other hand, were above their "feeding value" prices relatively to both chaff and wheat, and pease relatively to wheat alone.

From these statements it will be realised that chaff was by far the most costly livestock foodstuff on the market; and yet it continued throughout to be most eagerly sought after, to the almost complete neglect of relatively cheaper concentrated foodstuffs. I do not wish to argue that we can do without chaff altogether; very far from it; but it must be apparent that when other interchangeable foodstuffs are available at far more advantageous prices, it is hardly good business not to take full advantage of them.

THE "FEEDING VALUE" PRICE OF FOODSTUFFS RICH IN PROTEIN.

It may perhaps be argued that any attempt to determine the relative money value of foodstuffs on a basis of starch equivalents does but scant justice to those specially rich in protein, such as lucerne, clovers, leguminous grains, bran, &c. And to the extent that the physiological function of protein is essentially dual—flesh-forming on the one hand, and fat-forming and energy developing on the other—the objection is more or less well grounded. Moreover, we have already had occasion to remark that in a normal season like 1909-10 pease, naturally very rich in protein, were 12 per cent. above their normal "feeding value" price, whereas all other grains relatively poor in protein were slightly below their "feeding value" prices; hence we may be inclined to infer that at times the market shows greater discrimination than the starch equivalents theory.

In this connection, however, we must not overlook the fact that there is not necessarily any logical connection between "market" prices and "feeding value" prices; the former are governed mainly by the laws of supply and demand, and incidentally by the cost of production; whilst the latter are purely relative, and may be taken to represent an approximate standard of efficiency. Thus it is a matter of common experience that the market price of "protein" is almost invariably higher than that of "carbohydrates," whether it be considered from the point of view of human consumption, or from that of the feeding requirements of livestock. Meat, for example, is a more costly foodstuff than flour; and usually to an extent that is not justified by its relative feeding value.

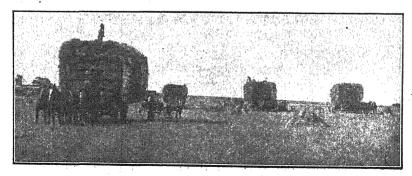
It may be admitted, however, that the starch equivalents do not take into special account the flesh-forming function of protein, but merely assess the latter from the point of view of the formation of fat and the development of energy—functions which protein shares

equally with the carbohydrates and fats of foodstuffs. And to this extent full justice is not perhaps done to the "feeding value" of foodstuffs specially rich in protein.

On the other hand, protein, whilst quite essential to certain special requirements of the animal organism, is as a rule needed in proportions so small as to render more or less misleading any enhancement of the "feeding value" price based on the presence in the foodstuff of unusually large proportions of this constituent. In other words, apart from the special requirements of young growing animals and milch cows, the amount of protein required by livestock to make good body waste is exceedingly small; and whilst any excess of protein in foodstuffs is not wasted, it can be paid for at too high a price when it merely takes the place of cheaper foodstuff constituents. illustrate the position. A horse doing average work requires about 1.6lbs. of digestible crude protein daily per 1,000lbs. liveweight, i.e., no more than is present in 13.2lbs. of good lucerne hay. Now, 13.2lbs. of lucerne hay can hardly be claimed to be a sufficient working ration for a horse 1,000lbs, in weight; if we assume 40lbs, to suffice for the purpose we should be supplying 3!lbs. of crude protein in excess of actual requirements, which excesss would do no more than take the place of an equivalent quantity of fat or carbohydrate.

Hence, in ordinary circumstances, the starch equivalents may be taken to establish fairly well the approximate "feeding value" prices of even those foodstuffs unusually rich in protein.

(To be continued.)



Haymaking.

SOILS AND THEIR TREATMENT.

[An address delivered by the Superintendent of Experimental Work (Mr. W. J. Spafford), before the members of the Nantawarra Branch of the Agricultural Bureau.]

SOILS.

This subject is a very large one with which to deal in a short address. In it I will endeavor to confine my remarks to soils met with in the district, with the hope of extracting something from such a large mass, likely to be of interest and use in the handling of the various types.

To understand the why and wherefore of the various operations conducted by us in the working of our soils, it first becomes necessary to know something of the origin of soils, and also the natural laws applying to them.

Many people have defined "soil," and in many different ways—most of them in terms too complex to be readily understood; but I think we can take as the simplest and most commonsense the following definition:—"Soil" is that portion of the loose earthy material covering the bulk of the exposed surface of the earth, that comes within the reach of ordinary tillage operations. The "subsoil," then, is the loose earthy material immediately below the soil.

ORIGIN OF SOILS.

It is common knowledge that the main framework of the earth consists of huge masses of rocks, and that the loose earthy material we call soil and subsoil is only a comparatively thin layer on the surface. We see these rocks where the inclines are too steep for the loose material to collect, and where they are kept clear by such agencies as the sea; and we have only to go deep enough to find them anywhere on this earth. And geologists teach us that it is the splitting up of these rocks by natural agencies that have formed our soils. We must in this connection remember that the agencies that have given rise to soils, are still at work forming new soils and modifying existing ones; this fact must never be lost sight of, as some of our tillage operations are carried out to allow these agencies full play to improve the soil conditions.

The main natural forces at work in this connection are:-

1. The mechanical action of falling and running water, by wearing away rocks through the mere falling on them, or the rushing over them;

and more noticeably by carrying rocks, which wear one another away whilst being jostled together along with it.

- 2. The Mechanical Action of Glaciers.—Rocks become imbedded in the glaciers when the water freezes, and with their help they crush and grind the banks and beds of the valleys down which they travel.
- 3. The Mechanical Action of Extreme Changes of Temperature.—The expansion and contraction following these changes is sufficient in time to break up the rock surfaces. Where frosts are at all common this action is very powerful. All rocks—even highly polished granite—absorb water, and when a frost sets in, this water freezes, and as water expands on freezing, it leads to the shattering of the rock surfaces.

These mechanical agencies all lead to the formation of particles that are relatively coarse—all have seen that which comes down with the river water—gravel and sand; and most have seen the surfaces of exposed rocks fretting away into coarse matter. This being so, it is evident that there must be some other agents acting in a different manner from the above to produce the finer soil constituents. This is so, and they are known as agents having a chemical action in the formation of soils; the main ones are:—

- 4. Water: by dissolving out some portion of the rock and so undermining its structure.
- 5. Carbonic acid gas dissolved in water; also by dissolving out portions of the rocks.
- 6. Oxygen: by combining with portions of the rocks, and so splitting them up.
- 7. Finally we have the action of the roots of the plant which penetrate cracks, &c., and grow on the surface of rocks. These roots are constantly giving off carbonic acid gas, which helps in the disintegration of rocks. Also, when dead, plants aid in the breaking up of rocks by the liberation of carbonic acid gas when decomposing.

WORK DONE BY VARIOUS SOIL CONSTITUENTS.

The analysis of a plant reveals the presence of varying quantities of a large number of substances, and as the plant is fixed in the soil it is natural to think that the bulk of these substances are derived from the soil. But in the first place the plant must find in the soil a suitable place in which to be anchored for life, and in which its roots can travel freely in search of moisture and air. The suitability of a soil for this purpose depends on what is usually spoken of as its natural texture or mechanical condition; and this texture depends on the proportions of what may be termed the dominant soil constituents, *i.e.*, those separated in the mechanical analysis of soils, or those constituents

that are distinguishable by the eye. These are:—(1) Stones and coarse gravel; (2) fine gravel and sand; (3) silt; (4) clay; (5) calcium carbonate; (6) organic matter.

But, besides mere standing room, plants need access to sufficient supplies of materials with which to build up their tissues. This need, with the exception of the carbon which the plants take from the air as carbonic acid gas, and in some cases a portion of the nitrogen, which is also taken from the air, is filled wholly by the soil. These plant foods may be termed the non-dominant soil constituents or the constituents indistinguishable by the eye, and are only revealed by chemical analysis. The substances of most importance as plant food to be taken from the soil are:—Potash, soda, magnesia, lime, manganese, iron, phosphoric acid, nitrogen, sulphur, chlorine, silica. All of which, with a few others, must be found in sufficient quantities for healthy plant growth.

TEXTURE.

On the mechanical condition or texture of a soil will depend very largely its agricultural value. The texture must be such that the roots of plants, moisture, and air can penetrate it fairly freely; and it must permit ordinary cultural implements to penetrate and loosen the soil, without drifting.

One can imagine the uselessness of a soil for practical purposes that tillage implements will not enter, or if they do so, only with great difficulty; and also the other extreme, soils which blow away if loosened.

This texture, or mechanical condition, depends very largely on the proportions of the various dominant soil constituents and on the arrangement of the particles, as this to a large extent controls the soil moisture. If we take the soil particles to be all equal spheres, if they are packed straight on top of one another and side by side—no matter what the size of the spheres, so long as they are equal—the spaces between the soil particles, or what is usually known as the pore spaces. will be at its possible maximum. Again, packed obliquely, so that each sphere fits in the spaces of others—no matter what the size of the spheres so long as they are all equal—this will give the possible minimum pore space between the soil particles.

But taking the soil particles as consisting of spheres of different sizes and packed so that the smaller spheres are in the spaces of the larger ones, it is possible to reduce the pore spaces almost indefinitely. Again, if collections of soil particles exist containing pore spaces between the particles and between the aggregations, the pore space rises very considerably.

These differences in arrangments of particles, and the consequent differences in the resulting pore spaces gives an idea of the difference in the quantity of water a soil can hold.

AVAILABILITY OF MINERAL PLANT FOOD.

It is important to notice that mineral matter must be soluble in soil moisture before plants can make use of it. This is the only way in which mineral matter can get into the plant tissues. Plants are constantly taking water from the soil by means of their roots, and this is being constantly evaporated through their leaves; and, as far as is known, this moisture is the only thing taken in by the roots; so, if the mineral matter is not dissolved in it, it cannot enter the plants.

WATER REQUIREMENTS OF PLANTS.

We noted the demand of plants for mineral matter, and that it must be soluble in soil moisture to be able to reach the plants, and it is easy to realise a soil well stocked with available plant food and still starving because there is not enough water to carry it to the plants. The amount of water required by plants is very large, but this can be understood when we realise that the roots of plants are constantly taking moisture from the soil which passes up the plants and out of the leaves. The minute the plant gets to the stage of having more water evaporated from the leaves than the roots can make good, the plant begins to wilt. This is what happens when crops ''blight'' off.

The amount of water passing through plants has often been measured and put side by side with the amount of dry matter produced; and on the available figures we are quite safe in putting this figure for wheat at 300lbs, of water for every lb, of dry matter formed. If we follow this out it will give us some idea of the enormous amount the plants must find in the sil. A three-ton crop of hay retaining 10 per cent, of moisture when dry, will on this figure have passed 181,440galls, of water through its tissues, or 8in, of rain to the acre.

CAPACITY OF SOILS FOR WATER.

The growth of plants, therefore, depends very largely on the amount of water in the soil, and this will depend on the area of the total pore space, to which must be added the amount the individual particles can absorb without swelling, and also on the total area of the surface of the particles. This will always be greater in fine-grained soils than in coarse-grained, as the sum of the pore spaces and the total area of the surfaces of the particles is always greater in the former. A. D. Hall gives the following figures as the maximum amount soils can take up:—100lbs. sandy soil will take 45lbs. water; 100lbs. stiff clay will

take 98.6lbs. water. But on complete drainage the figures are altered to: 100lbs. sandy soil will retain 18lbs. water; 100lbs. stiff clay will retain 56.4lbs. water.

SURFACE TENSION.

Water that is retained by soils after complete natural drainage is held by the particles by what is known as surface tension. This is the same power that makes the hairs of a brush cling together when wetted, and that keeps the inside of a smooth receptacle like a glass tumbler wet, although the liquid has been poured out and the glass kept upside down for some time.

When rain falls the water in the soil gradually soaks down through the pore spaces under the forces of gravity, but it leaves a film of water surrounding every particle which is in contact with all other films, kept there by the attraction of surfaces of solids for liquids, or "surface tension." The water continues sinking through the soil, all the time thinning this continuous film round the particles, like stretching a rubber band, until the attraction of the particles is sufficient to equalise the pull of the forces of gravity; then the moisture sinks no further.

RISE OF SUBSOIL MOISTURE BY CAPILLARITY.

When the moisture has reached this state of equilibrium between these two forces, evaporation of water at the surface of the soil overcomes the forces of gravity. The moisture at the surface is taken off by evaporation, with the consequent thinning of the film at the surface. This thinning of the film at the surface means that the equilibrium just reached has been upset, with the greatest pull at the thinnest part of the film, like it is on a stretched rubber band, so that the moisture rises from the subsoil until a new equilibrium is reached. Of course this is not happening intermittently, except in rainy weather, but is quite continuous.

This explains why we fallow and cultivate to conserve moisture. We break the continuity of this film near the surface, with the result that the moisture only rises to the depth that the implements reached, and not right to the surface. After the first heavy rain the continuity of the film is re-established; so it is always recommended to cultivate after all rains. This is, perhaps, more easily explained by filling a sponge with water and hanging a dry brick so that it touches the sponge. The brick will suck all the water from the sponge; but do the reverse, fill a brick with water, and rest a sponge on the top of it. It will not draw much of the water from the brick. This means that the surface of the soil should be kept like the sponge, not like the brick.

HYGROSCOPIC MOISTURE OF SOILS.

After having evaporated by ordinary methods all the moisture that a soil will give off, there is always some moisture to which the soil clings very closely. This is known as hygroscopic moisture.

The moisture is for the soil alone, and is of no use to plants, as the soils will not give it up to them. Indeed plants begin to die for want of moisture when there is still more moisture in the soil than the hygroscopic moisture. The amount held by soils as hygroscopic moisture varies with the types, and depends on the relative sizes of the soil particles. A. D. Hall quotes the following figures as the amounts held by some soils:—Sandy soil, 1.15 per cent.; sandy loam. 5.74 per cent.; peat, 42.3 per cent.

CLASSIFICATION OF SOILS.

Many attempts to classify soils have been made, and the basis of each has varied with the individual undertaking it. The difficulty with most of these classifications has been the tendency to multiply the types, thus losing the benefit of such a thing because of the difficulty of understanding what is meant. The classification most likely to suit our purpose will be a very simple one, and is as follows:—(1) Light or sandy soils; (2) heavy or clayey soils; (3) loams; (4) calcareous soils; (5) organic or peat soils.

1. Light or Sandy Soils.—At the outset it will be as well to explain that these terms "light" and "heavy" bear no relation to the actual weight of these soils, but depend for their names on the amounced; of strength necessary to drag the ordinary tillage implement through them. In fact, what we know as "light" soils, i.e., sand, soils, which are easy to cultivate, may weigh 80lbs. per cubic foot whereas a very heavy soil, i.e., one rich in clay and difficult to cultivate, will rarely weigh to the cubic foot 66lbs.

Sandy soils are those in which the coarser soil constituents, gravel and sand, predominate.

- 2. Heavy or Clayey Soils.—These are soils in which the finer soil constituents, silt and clay, predominate.
- 3. Loams.—Loams are soils which have the dominant soil constituents in such proportions that they are well balanced; particularly the coarser constituents, gravel and sand, on the one hand, and the finer ones, silt and clay, on the other. In other words, they are soils that one cannot describe as either sandy soils or clay soils.
- 4. Calcareous soils are those containing such a proportion of lime that in a state of nature they carry a special lime-loving flora. In this State the flora characterising the lime soils are various mallees,

Alyxia (box bush), Cassia, various Acacias, Rhagodia, &c. It does not necessarily mean that wherever these plants are found that the soils are rich in lime, but wherever they are plentiful and well grown, it is so; they are to be found in places fairly deficient in lime, but always as ill-grown or misshapen specimens.

5. Organic or peaty soils are characterised by the presence of abnormal proportions of organic matter in various stages of decay.

We will consider the handling of these various types of soils, with the exception of the last, which will not be met with in this district.

LIGHT OR SANDY SOILS.

Light or sandy soils are easily distinguished from other types of soils by the ease with which tillage implements are pulled through them, and the easily seen, coarse, sandy particles. For all this they are by no means uniform in type, as they run from coarse, open, gravelly sands to very much heavier types, getting very close to the loams, or the neither heavy nor light soils. Other sands are really calcareous, due to the presence of large quantities of hard small particles of calcium carbonate or limestone.

Sandy soils must, as a rule, be considered as rather poor agricultural soils, due to two very evident reasons.

- (1) Because they are formed by the mechanical action of running water, and are sorted out in the streams, when the fine soil particles are washed out of them, to be deposited lower down in the stream; and
- (2) To their natural open porous nature, which admits of both the soluble materials and the finer particles being washed into the subsoil. Of the three main plant foods they originally contain but little phosphoric acid, and the nitrogen and potash are very quickly washed out of them.

These soils are what are known as "warm" and "early" soils; in other words, plants come to maturity in these soils sooner than in the heavier soils. This is due to the fact that they do not hold much moisture (being so very porus) a large bulk of which, when once cold, takes a long time to get warm.

Sandy soils do not need much water to make them sufficiently moist for seeds to germinate in them, and for plants to grow well; this is because they do not need much water for themselves, as was pointed out in connection with hygroscopic soil moisture. The following figures of A. D. Hall will give an idea of the differences of a few soils in this connection. The figures represent the amount of moisture in the soil when plants begin to wilt. Coarse sand, 1.5 per cent. moisture; sandy loam, 7.8 per cent. moisture; peat, 49.7 per cent. moisture.

These figures serve to show why it is that in years of light rainfall sandy soils often produce quite fair crops, while the heavier soils are often a complete failure. This last season gave a very large number of instances of this.

Handling.—In the handling of sandy soils for cereal growing the points always to be borne in mind are that they are notoriously dry soils, and as such, liable to drifting; and they are, as a rule, deficient in plant food, lime, and organic matter. With the first of these points in view, they should always, if possible, be cultivated and then left with a slight crust on the surface; this will reduce the chance of much of the surface blowing away.

Considering the small amount of plant food and organic matter present, they should be cropped as little as possible, and stocked as much as possible. In this connection I would suggest the following treatments as profitable, easily handled schemes, and ones that will increase the fertility of the land and reduce the liability to drifting:—

Five Year Rotation.—Bare fallow, wheat with lucerne, lucerne, lucerne, lucerne.

Four Year Rotation.—Bare fallow, wheat with rye grass, rye grass, rye grass.

HEAVY OR CLAYEY SOILS.

These soils are characterised by very large proportions of the fine soil constituents, silt and clay, and are easily recognised by the facts that they are heavy to work, clogging up all parts of implements that touch them, and they run together after rains. They like the sands, are not by any means uniform in type, as they grade away from exceptionally heavy, difficult soils to work, to heavy loams.

As sandy soils were described as "warm" and "early" these soils may be known as the opposite, i.e., "cold and late," and for the opposite reason to that given for sands; they hold a lot of moisture, which, when once cold, takes a lot of warming. Indeed, these soils have the power of absorbing large quantities of moisture, great retentiveness for it, and when saturated with it, complete imperviousness to it; i.e., once they get thoroughly wet, they will not allow any water through them. This fact is easily recognised, as it is only necessary to puddle a dam with clay to make it hold water.

Clay soils, as a rule, are well supplied with all the necessary plant foods, and as such are very fertile soils. This is not always actually so, for although they contain the necessary soil plant foods they do not always possess the necessary texture or mechanical condition for healthy plant growth. Of the main plant foods they are generally well stocked, because (1) they are derived from rocks known as felspars,

which are rich in potash; (2) their defective eration allows the accumulation of organic matter, which raises the proportion of nitrogen; and (3) although the proportion of phosphoric acid varies with individual soils, it is usually higher than in most other classes of soils.

The trouble with the texture of these soils is that the particles have great attraction for each other, both in the wet and the dry state. When wet the particles cling so closely to each other that they will let no more water pass them; on drying, they cling even tighter to one another, with the result that the land opens up in great cracks, disastrous to most crops grown on them. They are possessed of one great property, which must always be borne in mind in the handling of these soils, and that is what is known as the "flocculation" of the particles. This can be brought about by the addition of various substances to the soil or by properly applied tillage. cause of the defective texture of these is the fineness of these particles; and this flocculation of the particles is the bringing about of an artificial coarseness of the texture. This can be easily illustrated in the laboratory. If some clay is shaken up in water, the water immediately becomes very muddy; the coarser particles settle fairly soon, but the finer (those which cause the trouble as regards texture) will remain in the water for days without settling; indeed, some of them will never settle. Now, if a little lime is added to this muddy water it will almost immediately become clear, on account of the clay settling to the bottom. What has happened is that numbers of these small particles have been stuck together to make larger particles, which immediately settle. This is what happens in the soil when lime is applied to heavy soils, also when tillage operations are applied at This producing a good mechanical texture is the the right time. whole key to working heavy soils. As has already been pointed out they are naturally very fertile soils, so they are well worth under-This same flocculation of the particles is brought about by the addition of farmyard manure. Most farmers must have seen the marked improvement to heavy patches produced by the addition of lime or stable manure. Now tillage has exactly the same effect when applied at the right time, which is when the land is neither too wet nor too dry, more particularly when it is not too wet, i.e., when it is not wet enough for the particles to be pushed together with the As well as this power of "flocculation" of the particles, clay has the reverse property, or the power of "deflocculation" of the This, like the former, is brought about by the addition of substances or by tillage applied at incorrect times. Clay ploughed up when too wet dries out in lumps like bricks, which are exceedingly difficult to deal with. Some manures are notoriously bad "deflocculating" agents, the worst of which is nitrate of soda, which fortunately we are not called on at present to use to any great extent.

When drainage is not defective clay or heavy soils generally carry late feed, but large quantities of it.

Handling.—Heavy or clay soils being very difficult to till, and, if done at any but the right time leading to other difficulties, it follows that the greatest care must be exercised in all of these operations. As already shown, these soils must not be touched when too wet, so it is better for the fallowing to be late rather than wet. They are also very liable to develop a hard pan at depth of ploughing, so making them more impervious to roots and to water; so it is a wise practice never to plough them twice running at the same depth.

They should be cultivated after every rain with either the scarifier or harrow, so that they never have a distinct crust on the surface. These cultivations, like the ploughing, must not be done whilst the soil is too wet. As one of the texture troubles of these soils is that the surface runs together, they should not be worked down too finely on the surface right up to seeding time.

Being, as a rule, rich in plant food, they should be cropped more often than the lighter soils, but as they become deficient in organic matter, some of these crops should be for stock. In this connection I suggest the following arrangements of crops:—

Bare fallow, wheat, barley, rape.

Bare fallow, wheat, oats, rape.

Bare fallow, wheat, oats with rye grass, rye grass.

As these mechanical condition troubles arise through lack of lime very often, lime should be applied, either as a small quantity every seeding (3cwts. to 5cwts. to the acre) or else at the rate of a ton per acre once every four or five years. If lime is applied, it should always be done about a fortnight before the seed is put in.

LOAMS.

These soils are very hard to distinguish, as they are so very far from being uniform in type. They are about midway, as far as physical characters go, between clay and sand; but some, of course, trail off into sandy loams on one extreme and heavy loams on the other. Other loams again might just as well be termed calcareous soils. The fact of their being as they are, more or less intermediate between all other types of soils, helps to account for their goodness as agricultural soils. They are often described as having the good qualities of all the other types, the bad ones being counteracted by the presence of their opposites.

They are generally well stocked with all the necessary available plant foods, and have good natural mechanical condition, so that practically all plants that the climate suits grow well in them, and bacterial action takes place in them with the greatest of ease. They are good soils for feed, being both early and abundant, and of first-class quality.

Most alluvial soils, the fertility of which is proverbial, are included in this class.

Handling.—No special handling is necessary with these soils other than the recognised practice of the country.

These soils are, as a rule, too good for the ordinary practice of bare fallow-wheat, and I suggest for those who wish to make the most of their land in the shortest time, that a better practice would be bare fallow-wheat-barley; but as this class of farming is not good to the individual farm, nor to the country as a whole, stock should be run in conjunction, and then make the cropping bare fallow, wheat, pasture (pasture to have rape, oats, or some supplementary feed on it), or bare fallow, wheat, barley, pasture.

CALCAREOUS SOILS.

These soils are also hard to define, as they vary very widely, both as regards the percentage of lime and their mechanical condition. The proportion of lime varies from 5 per cent. to 60 per cent., and their consistency from the marls, which are more or less sticky when wet, to what may be termed calcareous sands. In this country most of our calcareous soils are characterised by the presence either of large hard limestones or else concretions of small, roundish stones. Some of these soils are very fertile, depending, as a rule, on the proportion of the fine soil constituents present, whilst others again are little better than the sandy soils; but, as a rule, in this State, they are very fair soils for cereal growing, excelling in quality rather than in quantity.

Handling.—The real marls, that is, clayey-limey soils, are comparatively rare in this country, so with our calcareous soils, other than for the stones present, there are no serious cultural difficulties. They, as a rule, can be worked when fairly wet without drying into clods, and in most cases they are heavy enough not to drift. As most of them are not exceptionally fertile soils they should not be over-cropped, and should be worked in conjunction with stock, to which they are well suited because of the sweet, health-giving feed they produce.

They are well suited for growing lucerne to be fed off, despite the fact that they, as a rule, dry out so quickly, and this makes a very

suitable crop to grow for fodder to help build up these soils. I suggest, as for sandy soils, that they should not be cropped too often, but treated under the following rotation:—Bare fallow, wheat with lucerne, lucerne, lucerne, lucerne; when very profitable returns will be obtained as well as improvement to the soils affected, and more interest added to the work. Other than this rotation they are well suited to bare fallow, wheat, barley, pasture, pasture.

THE COMING HARVEST.

PROPOSAL TO MEET POSSIBLE SHORTAGE OF LABOR.

With a view to minimising any possible difficulty which may arise on account of the inability of farmers to secure sufficient assistance to gather the wheat harvest this year, the Minister of Industry (Hon. R. P. Blundell, M.P.) has issued the following circular to farmers:—

Dear Sir—As you are probably aware, doubt exists in many quarters as to whether, in view of the large number of men who are serving in the Australian Forces, sufficient labor will be available for the ingathering of the coming harvest. This matter has received the serious consideration of the Government, and it has been decided to endeavor to organize the available labor—in order to make the best possible use of it.

To do this effectively we must necessarily have the co-operation of those requiring the labor for the harvest, and must have some reasonable estimate of the number of men required, their qualifications, &c. I shall be glad, therefore, if you will fill in the attached form and post it as early as possible, addressed to "Government Labor Exchange," Adelaide.

The form referred to provides for replies to the following questions:—Name? Postal address? Nearest railway station? How far from railway station is your farm? What is the means of communication? Do you require additional assistance to what you can secure locally? If so, how many men will you need? Set out what experience the men must have. Will men without farm experience be of service? What wages are you offering for different classes of work? Will you pay or advance rail or steamer fares? (Advance will be subject to agreement to deduction from wages.) If man fulfils his term of employment, will you pay fare one way? When will you require labor? For how long will you require these men? Add any remarks or suggestions that you would like to make.

TESTING OF AGRICULTURAL SEEDS IN SOUTH AUSTRALIA.

By H. W. Andrew, Botanical Assistant, Horticultural Branch.

NEED FOR AN ACT TO REGULATE THE PLANTING AND SOWING OF SEEDS.

It is a curious fact that while South Australia led the way in the Commonwealth in the direction of legislating with a view to restricting the importation of insect and fungus pests—the Vine, Fruit, and Vegetable Protection Act of 1885 was the first of its kind passed in Australia—practically nothing has been done by this State towards controlling the importation or sale of seeds here. The Phylloxera Act, the Fertiliser Acts, and Sale of Hay and Chaff Acts have all tended to protect the producing industry; but, with the exception of the recent examination by this Department, acting for the Federal authorities, of seeds imported from oversea sources under the Federal Quarantine and Commerce Acts, there has been no control over the distribution of agricultural seeds.

Harold C. Long, of the Board of Agriculture and Fisheries (Great Britain), in his standard work on "Common Weeds of the Farm and Garden," refers to this somewhat pointedly when he states—"There is in South Australia no supervision over the sale of seeds, and no guarantee is given by seedsmen, either as regards purity or germination capacity." This is the more remarkable when it is remembered that one of the chief means of disseminating weeds is by way of sowing agricultural seeds, while likewise plant diseases such as ergot of rye, smut of oats and wheat, and leaf scorch of celery are often spread with the seed. The fact that the last-mentioned disease produces some of its fructifications on the "seeds" of celery was only pointed out by Professor Osborn in this Journal in November, 1912.

Innumerable instances have been placed on record showing the importance of testing seeds for purity, but we need not go far afield for a striking instance of this. During the month of May last a representative sample ($\frac{1}{8}$ oz.) from a consignment of Brown Top grass from New Zealand, examined at this office, was found to contain 1,050 seeds of Rumex acetosella (sheep sorrel) and 749 seeds of other weeds.

At this rate, therefore, 230,272 weed seeds would be sown with every pound of the consignment. Needless to say, this consignment was condemned and destroyed under the provisions of the Federal Quarantine Act. There is no power, however, to destroy similarly infested seed or fodder from another State, or offered for sale within this State. A case in which such a State law would have been desirable came under notice a few weeks ago. A bag of peas was actually exposed for sale in Adelaide which contained an exceedingly large proportion of most healthy looking coiled pods of burr clover, which the shop assistant stated originated from Victoria, and were offered for sale "a bit cheaper" because of the presence of the weed.

The importance of the question of purity of seeds and high germinating power is now practically recognised the world over, while among Australian States, Victoria and Queensland have Acts of Parliament regulating the sale of seeds for planting and sowing. There is thus always the probability of inferior seeds—such as the abovementioned bag of peas containing "burr clover," or toothed Medic (Medicago denticulata)—being passed on to a State which is such law.

Impurities in seeds do not necessarily arise from purposeful adula-Many seeds are gathered from dirty crops. not always responsible for the dirt, particles of quartz, dir. so, Miten found in commercial samples. No doubt, however, where the foreign ingredient closely simulates or resembles in size and color the seed with which it is mixed, the adulteration is more than accidental. Again, seedsmen with a reputation to lose naturally show much addicitude in keeping their seed supplies clean—especially where some seedcontrolling legislation is in force. The report of the Seeds Commissioner of Canada for 1912-13 states that practically all the seed ing done there is for seed merchants and farmers, who desire in desire mation regarding the actual value of their seed, as indicated by in for nature and number of weed seeds contained and its general qualithe nature and number of weed seeds contained and its general qualithe nature and number of weed seeds contained and its general qualithe nature and number of weed seeds contained and its general qualithe the nature of the fact to ity. Here, also, though so far no publicity has been given to the fact seed samples may be tested at this office for impurities, samples h been submitted by seed merchants for this purpose, one firm pointifive out they wished to have the foreign seed contained in the samples identified, "as it was for a good customer, and did not want to seralong any noxious weed with their supplies." Merchants and pu'd chasers of seeds are not usually in a position to ascertain themselv, the identity of weed seeds contained in a consignment—especially in To be able to do this a comprehensive reference collect ported seed. tion of weed seeds of various countries is essential. Consequently

most countries are provided with well-equipped seed laboratories, having such collections and other requisites for testing.

SEED TESTING IN THE HORTICULTURAL BRANCH.

At present this department has few facilities for conducting germination tests to gauge the vitality of seeds—barely sufficient for conducting the necessary tests for seeds coming into the State from abroad—but in special cases sprouting tests will be undertaken and reported upon for farmers and others interested. However, if samples be sent to the Horticultural Instructor by farmers, gardeners, or seed merchants, these will be examined, and a certificate issued setting forth the nature and proportion of noxious and other impurities contained in any seeds purchased or otherwise obtained by them.

WORK DONE UNDER THE FEDERAL QUARANTINE ACT, ETC.

Under the Federal Quarantine Act the introduction into the Commonwealth of seeds or plants of over 140 species of noxious weeds is absolutely prohibited.

Under the Federal Commerce Act seeds imported must be true to name, and sound, fresh, and clean, although no standard has so far been set up, and discretion is allowed the Customs as to what constitutes quality in this respect.

Samples of all agricultural seeds imported from abroad are taken at Port Adelaide, the Outer Harbor, and the General Post Office, Adelaide, by officers of this Department, acting as Quarantine Officers for plants, and submitted to another officer in this office, who examines them to see what weed seeds they contain, and the quality of the consignment, gauged after germination tests have been made. Where any doubt exists as to whether they are suitable seeds to admit into the State, the Chief Quarantine Officer for Plants for South Australia (Mr. George Quinn) exercises powers conferred upon him under these Acts, and issues instructions for the goods to be freed (where practicable) of impurities, or to be destroyed or returned to the country of origin.

In most seed laboratories the results of purity tests are given in percentage by weight of pure seed, percentage of weed seeds, and percentage of inert matter, but the method adopted here is the same as that adopted in Canada. As recently pointed out by that department, "a sample containing a high percentage of pure seed may often contain a far larger number of weed seeds per unit weight than a sample showing a much smaller percentage of pure seed. The

average farmer cannot appreciate the value of a sample, say, of Timothy seed from a certificate of analysis, which states that the seed contains 0.5 per cent. of oxeye daisy, as he can from one which tens him that 1oz. of his seed contains 478 seeds of oxeye daisy." Results, therefore, of our tests are shown in this way, i.c., the number of weed seeds in a given weight.

An outstanding feature of the results of tests made here is the marked variation in quality of the seed imported. They show unmistakably that while it may be impracticable to secure seed free from weeds (owing to their similar size or shape not allowing them to be screened), from certain sources, much good might be done by importers here ordering seed from a different source. Doubtless some producers of seeds have much better methods of harvesting than others. Probably, especially in the Northern Hemisphere, boys and girls are sometimes employed who are unable to discriminate carefully between weeds and the cultivated plants, while others employ better harvest-In any case, there is considerable difference in ing "machinery." the purity of different consignments, even of the same variety of It is possible that after the rejection by this Department of a few more consignments of impure seeds, importers will protect themselves against unscrupulous or careless exporters, by stipulating invariably in their contracts for seeds bearing a certificate of the country of origin in respect to their purity and vitality.

WHY NOT PRODUCE OUR OWN AGRICULTURAL SEEDS?

The majority of our agricultural seeds (apart from cereals) are imported from extra-Australian sources. That this should be so is, to say the least, anomalous. We have, particularly in these troublous times, every reason to see the need for a country to be as self-sustaining as possible. There does not, in this instance, appear to be the question of cheap labor involved. The United States and New Zealand are great producers and exporters of these commodities. of these seeds when sown thrive in our gardens and farms, and reproduce well-matured and fertile seeds, and yet considerable quantities are regularly imported for sowing. It is not a question, either, of new varieties. We import year after year varieties of peas and other plants, which could undoubtedly be reaped here for seed as well. the sowing of acclimatised seeds (locally grown) has a beneficial influence on the resulting plants, seeds grown generation after generation here would have this advantage over imported seed-and, further, there would not be the great danger of introducing new weeds or diseases with them to the country orThe whole matter would appear to resolve itself

old trouble that "nothing is good unless imported." An idea of what might be done in the way of producing our own seed may be gathered from an example set by an individual in the Mount Lofty Ranges, in a district where subterranean clover (Trifolium subterranean) has established itself. This man has a well-equipped plant for gathering and dressing seed of this valuable clover, which is now produced here on a commercial scale.

GERMINATION TESTS.

The value of seed depends not only on the extent and nature of impurities, its worth is also largely determined by its sprouting capacity as an evidence of vitality. Seed tested under artificial conditions—such as are found in a germinator set up after a standard model—are subjected generally to even more favorable conditions than those existing under ordinary field conditions, where they are exposed often to extremely variable and unsuitable temperature, moisture, and other environment. In respect to the method of germination, it is customary to make tests in duplicate (two lots of 100 seeds each). These are placed, according to the kind of seed, on top or between sheets of blotting paper, or in sand, etc., contained in porous seed pans, which are then put in the germinator and kept at desired temperature. The sprouted seeds are removed and recorded By this means, with attention to details, it is posevery other day. sible to estimate whether the seed is uniformly new or mixed with older seeds, and the total percentage of seeds, etc., capable of sprout-Work of this sort is obviously of much value to the persons In sowing seed with low germinating capacity farmers or others should put in a greater quantity than in the case of fresh material, if it is desired to get the best results. Of course, even here the purchaser is the loser. He probably pays the same price as he would for good seed, and also bears the cost of extra handling, and possibly freight charges, for a proportion of useless seed.

From the 1st January to 31st August, 1915, 182 samples of seeds were obtained, in respect to which purity and germination tests were conducted (the latter in duplicate in nearly all cases). The results of these tests will be published in a later issue of the *Journal*.

BELGIAN RELIEF FUND.

In connection with the above-named fund, a proposal was made that farmers in this State should be asked to contribute the produce from a certain portion of the acreage which they put under crop during the present season, for the relief of the Belgians. The idea was readily taken up, and the members of a number of Branches of the Agricultural Bureau have responded. In nearly every instance, the majority of the members of the Branches mentioned below have signified their intention of contributing the produce of areas varying from one to 10 acres.

The highest total contribution from an individual Branch is 71 acres. Some members, as an alternative, have donated cash in amounts varying from £1 to £5.

The following list comprises those Branches which have notified the Secretary to the Advisory Board of their intention to contribute:—

Appila-Yarrowie	Hartley	Naracoorte
Blackwood	Inman Valley	Narridy
Bookpurnong East	Kadina	Parilla
Borrika	Kanmantoo	Petina
Burra	Kybybolite	Port Broughton
Bute	Lameroo	Port Elliot
Butler	Leighton	Quorn
Canowie Belt	Maitland	Sherlock
Carrow	Milang	Stockport
Clanfield	Millicent	Tarcowie
Claypan Bore	Miltalie	Tintinara
Coomandook	Mindarie	Waikerie
Coonalpyn	Minlaton	Whyte-Yarcowie
Coonawarra	Mitchell	Willowie
Frances	Moonta	Woodleigh
Georgetown	Morchard	Woodside
Geranium	Morgan	Wynarka
Goode	Mount Pleasant	Yallunda
Green Patch	Myponga	Yeelanna
Halidon	McNamara Bore	Yongala Vale

THE LATE MR. C. J. VALENTINE.

On September 13th, at North Adelaide, the death occurred of Mr. C. J. Valentine, formerly Chief Inspector of Stock in this State, and up till the time of his death a member of the Advisory Board of Agriculture.



The deceased, who was born in Sussex, England, arrived in Australia in 1852. In 1865 he succeeded Mr. T. T. Morris as Chief Inspector of Sheep, and acted in conjunction with the then Surveyor-

General (the late Mr. G. W. Goyder) as Valuator of Runs. When the Brands Act came into force, Mr. Valentine was appointed Inspector of Brands. During his 40 years' service with the Government he brought to bear a wide knowledge of matters appertaining to stock, an undoubted administrative ability, and untiring enthusiasm. His retirement from the Public Service in 1905 did not mark an end to his career in the public interest. Since then, until the time of his decease, he has been a much valued member of the Agricultural Bureau.

FRUIT GROWING ON THE RECLAIMED AREAS OF THE MURRAY.

In reply to a correspondent who sought guidance in the matter of planting fruit trees on the reclaimed land of the lower Murray Valley at Mypolonga, the Horticultural Instructor (Mr. George Quinn) supplied the following:—

Select sloping ground, and, as far as practicable, sheltered from the prevailing winds—an eastern or north-eastern aspect is probably preferable.

Plant the trees not less than 22ft. apart, on the square system, which distance requires 90 trees to the acre. Allow 25ft. to 30ft. headland past outside rows.

The best trees for the locality are peach, apricot, fig, almond, and citrus (orange); grape vines and pears doubtlessly will also thrive. In planting, the citrus grow best on the deep sandy soils which are usually high up on the slopes. This position is also, as a rule, better drained than the lower parts, hence more desirable for the citrus on that account.

I should put citrus on top of the slope, stone fruits, such as peach and apricot in the centre, and pears at the lower part if the land shelves off into a flatter surface at the lowest part. Pears also will withstand the greater volume of moisture which gravitates to the lower points of the slopes. Almonds should succeed on these lands, and a row of trees set 8ft. or 10ft. from the boundary, and about the same distance, say, 10ft. apart, will give shelter as well as nuts. These trees should not be watered frequently, but the soil must be cultivated on each side of the row. Figs may also be planted as shelter borders, set 16ft. to 20ft. apart.

LONDON PRODUCE MARKETS.

TRADE COMMISSIONER'S REPORT.

The following extracts are from a report of the Trade Commissioner in London, dated July 20th, 1915:—

BUTTER AND MARGARINE

Best Danish butter to-day is worth about 160s, per cwt., and the alternative Continental markets, which the Danes are in a position to cater for and have at their disposal, are keen bidders for supplies at this figure.

Medium Irish butters, despite their extremely unsatisfactory keeping properties, are saleable at values equal to about 142s. per cwt. Best quality margarine, on the other hand, can be had at 58s. per cwt. In flavor, the latter is infinitely superior to many secondary grades of blended butters now being sold, and with the vast margin of difference in value in the wholesale and retail prices, it is only reasonable to anticipate that the demand for margarine is increasing with amazing rapidity in England. The following table of comparison will give some idea of the increase of imports over corresponding weeks for the last three years, and the table of butter appended for the same period will also be of interest. Figures are as follows:—

	1915.	1914.	1913.
	Cwts.	Cwts.	Cwts.
Margarine	29,820	28,313	25,230
Butter	58,250	92,760	92.262

The manufacture of margarine is now being conducted on the most scientific lines possible. The margarine itself is, if anything, more readily susceptible to the absorption of taint even than butter is, and so keen have manufacturers become to ensure its production on wholesome lines that in some of the later built factories even the air of the room in which the manufacture is carried on undergoes a cleaning process, and aluminum churns and vats have superceded those of wood which were previously used, in order to obviate the slightest possibility of contamination.

Butter, as an article of diet, is essential to the British consumer; but, whilst admitting this, we cannot overlook the fact that economy in war time, when the necessities of life are realising such abnormally high values, necessitates the British housewife purchasing, if possible, a cheaper and yet equally palatable substitute for butter, and this, perhaps, is one of the main reasons for the alarming increase in the consumption of margarine.

SOUTH AFRICAN FRUIT TRADE.

The excellent trade in soft fruits, viz., peaches, nectarines, plums, apricots, pears, grapes, &c., which South Africa has developed with the Home markets, and the excellent manner in which the bulk of this fruit arrives in England led me to make inquiries regarding their means of transport and methods of packing for comparison with the methods applied to a similar trade in South Australia. I do not for a moment anticipate that we can ever hope to seriously entertain the consideration of an export trade in the majority of the classes mentioned above; but, as far as grapes and pears are concerned, I am of opinion that if it were possible to arrange for separate storage at a lower degree of temperature than is now applied for apple storage on board ships carrying fruit from Australia, the heavy losses which so often attend shipments of grapes and pears would be considerably minimised. Cape Town is situated about 6,000 miles from London markets, or approximately half the distance to Adelaide, and it is estimated that the fruit shipped from South Africa takes 19 days to travel from the Cape Town docks to Covent Garden, so that with the excellent weekly refrigerated steamer service which the South African growers have at their disposal, it is quite possible to place the most delicate fruits on Covent Garden in excellent condition.

The following varieties of pears, peaches, and grapes and plums constitute the most popular kinds exported from South Africa:—Pears.—Doyenne de Comice, Josephine de Maline, Clapp's Favourite, Louis Bonne, Glou Morceau, Winter Nelis, Beurre Bosc, Bon Chretien, Beurre Hardy, Beurre Diel, Duchess de Angouleme. Grapes.—Red Hanepoot, Barbarossa, Flaming Tokai, Gros Colmar, Raisin Blanc, Hermitage, White Hanepoot. Peaches.—Duke of York, Early Alexander, Early Rivers, Gladstones, Elbertas, Crawfords, Fosters. Plums.—Apple plums, Satsumas, Kelseys, Wicksons, Chalcots, Sultanas, Simonis, Black Diamonds, Burbanks. Shipments are not confined to London alone, as large consignments, prior to the outbreak of hostilities, found their way to Continental markets, principally Paris, Hamburg, and Amsterdam. The American market as well is receiving attention, and reports indicate that plums, peaches, and melons form the main shipments in that direction.

In the South African Trade Commissioner's Report, dated December 31st, 1913, dealing with the question of cold storage as applied to the softer varieties of fruit, the writer of the report estimates that the "life" of these varieties of soft fruit is approximately 29 to 30 days, this time being based from the time of leaving the docks at Capetown, so that approximately 10 days is available at this end for the disposal and consumption of the various consignments shipped from South Africa.

A Government regulation in force in South Africa makes it compulsory for all fruit intended for export to be cooled for at least 48 hours before shipment. This regulation, as far as the English market is concerned, is rigorously

enforced, and fruit arriving too late to permit of the usual 48-hour period of refrigeration is held over until next week's boat. The enforcing of this regulation has raised a controversy of opinion as to the advisability of holding fruit over for the extra week or placing it on board without pre-cooling. The matter was referred by the Association Internationale du Froid to American experts for an opinion on the subject.

The questions asked were replied to by William A. Taylor, Esq., Chief of the Bureau of Plant Industry of the Department of Agriculture, United States of America, and the following extracts will be read with interest in South Australia:—

- (a) Pre-cooling of fruit destined for either transportation or storage is only necessary to insure a prompt lowering of temperature to a point where the ripening processes will be retarded sufficiently to insure preservation of the product for the desired time, or to check the development of such organisms as the mould fungi, which secure entrance to the fruit through bruises, abrasions, &c., where it has not been handled with sufficient care. The essential thing, judged from our investigations on the subject, is prompt cooling. If the refrigerating capacity of a ship's cool chamber is sufficient to cool the fruit to the desired temperature as soon after the fruit is removed from the tree as it would be cooled in a storage house on land, we know of no reason why pre-cooling should be practised. Under conditions existing in this country, especially with reference to our refrigerator car service, it has been found that the refrigerating capacity of the car is insufficient to cool the full carload promptly enough to check ripening to the desired extent. Carloads of fruit loaded warm have frequently required four or five days' time to reduce the fruit to the desired temperature, during which period ripening has proceeded altogether too far to permit delivery in good order at the journey's end, 10 or 12 days subsequent to loading.
- (b) Whether the ship's cold chamber could cool down warm fruit as soon as an ordinary cold storage on land will depend entirely upon the relation of the refrigerating equipment to the quantity of fruit to be cooled and its temperature when placed in the chamber. The principles involved are identical, whether in the ship's chamber or the storage warehouse.
- (c) The effect of holding such fruits as peaches, apricots, nectarines, plums, grapes, and pineapples back for a week would be to shorten their possible shipment durability by just that time, provided the same temperatures could be had on the ship as in the warehouse, and the stowage could be such as to permit that free circulation of air in the chamber which is required for prompt cooling.

The whole may perhaps be summed up as follows:—Other things being equal, the essential factor is prompt cooling after removal of the fruit from the tree. So far as its effect upon the fruit is concerned, the question of where this cooling is done is immaterial. The necessity for pre-cooling arises when prompt cooling in the car or refrigerating compartment is impracticable.

The report also covers experiments conducted in South Africa by the Government Fruit Inspector to ascertain the best temperature adapted for the storage of soft fruits. The tests conducted proved that the most satisfactory results were achieved by keeping the storage rooms at an even temperature of 32 degrees. Practical results proved that no harm was done to the fruit if the temperature ran down to 28 degrees and 30 degrees, provided they were not kept at that temperature for a lengthy period; but, on the other hand, any fluctuation in temperature above 32 degrees was proved to have a very quick ripening effect upon the fruit stored.

I am indebted to the Trade Commissioner for South Africa for the following approximate table of costs, which includes transportation from the orchard of South Africa to Nine Elms Station, London, and the cost of package and material used in packing. To complete these costs, has to be added the cost of labor and packing, and the London bale charges, which expense, I understand, is covered by a 10 per cent. increase. The costs, as applied to the different varieties, are as follows:—

								N.	a.
Peaches and nectarines,	single layer trays,	counts	20	to	28			1	8
Plums		66	24	to	32			1	6
Apricots	44	"	24	to	36			1	1
Pears	4.6	**	24	to	36			1	11
Grapes, 10lb. boxes				٠.				2	0
Pineapples, single layers	—1doz							2	2
Apples, 1 bush. boxes						٠.		3	()
Oranges, standard boxes	-counts 96 to 100)	. 					4	6

It will be seen that the tray system of packing has been universally adopted. I am obtaining particulars in detail regarding the exact methods employed in packing the different classes of fruit shipped, and as near as I can ascertain, the methods are as follows:—

Pears.—These are packed in trays, the outside measurements of which vary, some being 18in. x 12in., and others 24in. x 18in., the depth being optional, but usually about 4in. The Government grading regulations as regards size are as follows:—

	Extra Selected.		
	(Diameter.)	(Diameter.)	(Diameter.)
Bon Chretien	$2^{\frac{3}{4}}$ inch.	24 inch.	`24 inch. '
Dovenne de Comice	3* "	23 "	
Loise Bonne	21 " 2234 " 234 " 23 "	2‡ "	$2\frac{1}{2}$ " 2
Buerre Bose	2¾ "	$2\frac{7}{5}$ "	24 "
Winter Nelis	. 23 "	21 "	21 "
Beurre Hardy	. 23 "	21 "	21 "
Glou Morceau	. 3 "	215 " " " " " " " " " " " " " " " " " " "	21 "
Clapp's Favorite	. 3 "	21 "	21 "

If any fruit is shipped smaller in size than the smallest size indicated in the above table, it has to be marked "lowest grade." As regards the actual condition and packing, I cannot do better than quote a letter just received from the Trade Commissioner for South Africa on the question, which reads as follows:—

Condition and Packing.—In nearly every instance the fruit is picked on the green side, especially the "Bon Chretien" variety, as this fruit ripens very rapidly after it is removed from the cool chamber. Each fruit is wrapped in tissue paper (on which is printed the grower's "brand"), and a little wood-wool is placed at the bottom of the box. The fruit is neatly and evenly laid thereon, with a further quantity of wood-wool between each fruit to prevent bruising. A layer of wood-wool is then placed on the top, and the package nailed down. Slack packing is to be avoided. The number of fruits in a box varies according to the size, but usually the counts are from 17 to 21's for "Extra Selected," 21's to 28's for "Selected," and from 28's to 33's for "Graded."

Peaches.—The same size box or tray is used for this fruit as in the case of pears and practically a similar method of packing is adopted. The counts of the boxes vary. The 12's to 18's are for the "Extra Selected" fruits, and each fruit is surrounded by a small partition of wood-wool which forms a kind of nest for the reception of the fruit. The counts of 20's to 28's and up to 35's are packed with a smaller amount of wood-wool. A layer is placed at the bottom of the box and a little round the sides. The fruit wrapped in tissue paper is then placed in the box and made quite firm with only a very small amount of wood-wool between the fruit. A further thin layer of this packing material is then placed over all, and the package nailed down.

It may be mentioned that the excessive use of wood-wool in the packing, especially of peaches and plums, is supposed to injure the fruit, and, to use a Covent Garden expression, to "cook" it. The chief varieties of peaches exported to the European markets are "Old Cape Freestones," "Early Alexander," and "Gladstones." The "Alberta" peach, which is the yellow flesh variety, is sometimes sent, but realises poor prices. The export, however, is not encouraged. South African peaches are packed slightly on the green side, but by no means dead green. Those packed a little on the green side, and having a good color, are most sought after by Continental buyers, as such fruit travels better. The riper fruit is preferred for the London and Provincial markets.

Plums.—The same method is adopted as in the case of peaches. The "Wickson" and "Kelson" varieties are packed on the green side.

Grapes.—Export grapes are usually picked early in the morning in the western portion of the Cape Province, before the great heat of the day comes on. They should be gathered in shallow boxes and carefully taken to the packing houses, where they should be allowed to remain for at least 24 hours before they are packed. During this period it is customary to do what thinning and cutting out of green berries is needed. The object of holding the grapes over in this way is to toughen their skins to a certain extent and thus enable them to travel better than would be the case if they were placed immediately in the boxes after picking. The favorite box in use for packing for export just now is one which contains about 101bs, of grapes and measures about 18in, long by 12in, wide and 6in, deep; crates are also used but are not recommended by London receivers. Each bunch of grapes is packed separately in clean white paper and the box filled sufficiently to prevent fruit shaking about while in transit. When the consignment is ready for export the boxes are placed on a light spring cart and taken to the nearest railway station, where they are loaded on board the train and taken to the cold storage, in which they remain for at least 48 hours before being taken to the steamer. The actual loading of the fruit on to the steamer is accomplished by placing the boxes on a platform about 12ft, square. On this platform they are piled up about six to eight high, then the whole thing, platform and all, is slung by means of a derrick from the wharf down to the hold of the vessel, from which they are removed at once to the cool chamber and kept at a temperature of 32 degrees F. until arrival at their destination oversea.

An interesting feature of the grape packing is that cork dust is dispensed with altogether. The only packing used now is a fairly large quantity of wood-wool placed around the bottom and sides of the box and distributed through between the bunches.

POULTRY NOTES.

By D. F. LAURIE, Government Poultry Expert and Lecturer.

TABLE POULTRY-PROBABLE SCARCITY.

Throughout the States there is a great shortage of poultry, and although breeders have operated freely during the present breeding season, much of the stock bred will not be available for market, as it will be kept for future breeding and egg production. South Australian breeders have hitherto paid more attention to egg production than to breeding for a regular supply of high-class table poultry. As the greater part of the poultry stocks consist of light breeds, such as Leghorns and so on, and of small mongrel farm fowls, the supply of well-fleshed table birds will be very limited. High prices may therefore be expected, and as such prices are governed largely by size and weight, it is important that breeders, and especially farmers, should take steps to obtain the best results.

The best table birds are bred from the special table breeds, such as Old English Game, Dorkings, Faverolles, Sussex, and their crosses. Excellent table birds are bred from Orpingtons, Wyandottes, Plymouth Rocks, Rhode Island Reds, pure or crossed with Indian Game and Old English Game. Large but coarser sorts are bred from hens of the large breeds mated with Malay male birds. Good farm mongrels of large-bodied types will give chickens which will sell fairly well, and where Game or Malay blood has been added, the results will be still better.

Quality of flesh and skin are points which count in European markets, but are not pre-eminent in this State. Here size and weight are the ruling factors; but there are signs of a growing appreciation of other important points. Taking the breeds seriatim, a brief review of the main points will serve as a guide.

Dorkings.—Flesh and skin delicate, white, and of fine flavor. The breed does not give good results except in special localities.

Old English Game.—Flesh and skin delicate, white, and of superlative flavor. Hardy, vigorous; hens good layers.

Faverolles.—Flesh and skin delicate, white, and of excellent flavor. This breed is par excellence a table breed, and is hardy and fattens exceptionally well.

Sussex.—Flesh and skin white and of fine quality. Sussex and Surrey fowls command the highest prices on London markets.

The cross between Old English Game cocks and hens of Dorking, Favorelle, or Sussex breeds give a splendid quick-growing chicken of the best possible quality.

Langshan.—This breed, as originally introduced, was black, with dark legs, slightly feathered. The skin and flesh are white and of fine quality. Is considered rather slow-growing, but fattens fairly easily.

Orpingtons.—As a rule the flesh and skin are delicate, white, and of good flavor. The breed ranks very highly as a table bird. The black variety has black legs, which militate against success in the English market. All the varieties are of equal merit as to quality.

Wyandottes have yellow legs, yellow or creamy skin and flesh, but the quality is good. The breed is a compact one, and fattens readily. Of medium size.

Plymouth Rocks have yellow legs and creamy to lightly tinted flesh and skin. They are large and carry good meat, and are excellent for market. Some strains excel.

Rhode Island Reds are good table birds, with yellow legs, skin, and flesh. The quality is good and the flavor distinct. The breed has a future before it.

Indian Game.—This carries a large quantity of meat; the legs, skin, and flesh are yellow, the flavor is good, but the quality of the flesh is not the best. The great value of the breed lies in producing splendid crossbred chickens when mated with the other breeds. The crossbreds inherit the marvellous breast development, and have a good appearance.

Quality can be improved by proper methods of feeding and the selection of foods. Farmers as a rule have skim milk available, and the addition of very limited quantities in the mash will help forward the process of fattening, and also will give fine white flesh. Where milk is not available, excellent results accrue from ordinary mash mixed with water.

WHEN TO START.

Where possible, the birds intended for sale as table fowls should be specially treated as soon as they are half-grown. It is important to see that the birds selected for preparation for market are well grown and in good health. As internal parasites are prevalent among poultry, it is always a good plan to treat each batch of youngsters before drafting them into the developing yards.

YARD FEEDING.

The birds selected should be graded into sizes and placed in convenient vards. Here they are fed sparingly until they settle down, when they can have three meals a day. Bran and pollard, with a little green food added, will make a good mash. Meat does not conduce to good flavor, and is not necessary. Give them as much mash, three times a day, as they can clean up in 20 minutes. Later on, when the new crop of wheat is available, the mash may be made of ground wheat, with a little bran added, and boiled wheat may also be fed occasionally. The birds can remain in this yard for from a fortnight to a month, during which time they are developing their frames. Where there is a good demand for 3½lb. to 4lb. birds they may be drafted at 10 to 12 weeks old into smaller yards and fed four times a day. The mash may be the same as before, but should have, if obtainable, daily, for every 40 birds, \$1b. of fat or sweet tallow added. This may be melted and rubbed with a little bran and pollard, and then distributed through the mash before it is moistened. During the finishing period—two or three weeks—green food should gradually be diminished, and none given during the last This method of fattening is within the capacity of any breeder and of farmers. The cost of feeding is relatively small. The birds gain flesh quicker than if at large, and there is proper method. The improved condition and appearance make such birds sell well.

The general mistake made by farmers is in keeping surplus cockerels and pullets until they are grown up, and the flesh is hard. Such birds bring indifferent prices. Young birds—chickens, from four to five months old at the most—cost less to produce, and, if well fed, bring good prices, and the result is profitable. City buyers like plump well-grown chickens of from 3lbs. to 5lbs. weight, and these are the most profitable weights to produce.

FATTENING IN COOPS.

By this method of fattening extra condition can be gained, but more attention is needed. Where breeders have private markets good results may be obtained. Proper sanitary fattening coops are required, and V-shaped troughs running along the front are fitted. When the chickens reach the required stage of growth for the production of small, medium, or large fatted chickens they are placed in coops, allowing sufficient space to turn about freely. They should be starved for a day, and then in the morning given a very small feed, and again at night. The object is to get them hungry first, and then gradually increase the food, until they have three good meals

daily. Wheat meal and a little bran made into a thin porridge with warm water or skim milk is excellent, and they will soon learn to consume large quantities. A trough containing gravel and charcoal grit is always a necessity where fowls are being fattened. With the trough method no drinking vessel is supplied, as there is moisture enough in the thin mash. Give no green food. Add melted fat if available, as previously mentioned.

CRAMMING

cither by hand or machine produces the finest and plumpest birds, but is work for the methodical, energetic man only. Such a man can make the highest prices, and can always sell more than he can fatten. For the average breeder and for the farmer the yard and coop methods will suffice, and if generally adopted the consumer could have something good for his money, and the producer would find much profit in the business.

FALSE ECONOMY.

It is false economy on the part of the breeder to sell ill-conditioned table poultry, and it is extravagance on the part of the purchaser to buy such birds. There is little flesh on their bodies, and what there is is of poor quality and flavor. A really well-fattened chicken costs a little more, but goes much further, and then the meat is worth eating.

DRY MASH FATTENING.

Chickens do excellently on dry mash from a month or six weeks old. An excellent plan is to place one or two dry mash hoppers in each yard, so that the chickens can help themselves. to the dry mash you may give wet mash morning and night, and this may contain a third of whole grain or boiled grain. Dry mash is an American term for something that manifestly is not mash. may be bran and pollard or ground grain, one sort or many, and mixed. As a rule, grit and charcoal are added. It may be variously compounded, according to the foodstuffs commonly and economically What is cheap in one place may be out of the question Where one has a small mill, various mixtures may be in another. compounded. Oats are splendid if they can be finely ground, hulls If not, there is too much long fibre; hulled oats are too dear. Barley is excellent—barley pollard helps the process of fat-Ground maize is fattening, but the fat so produced is not desirable—it is too oily, and the flesh is dark. A little ground maize, however, is excellent. Pea meal is a flesh producer, and when available may be added. Variety is desirable, because from mixtures you gain better results than from a monotonous diet of one kind. No hard and fast rule can be laid down to suit all localities.

POINTS TO NOTE.

All fattening stock must be kept quite quiet; the less exercise the better.

Fattening coops must be in a secluded spot, out of sight of birds at liberty. A cool, dark shed is a suitable locality. All coops must be kept clean and disinfected. Yards must be cleaned regularly, and the ground forked over. Tainted ground will result in disease.

Any bird which refuses its food, or which has undigested food in its crop, should be removed and given liberty on a grass run, and starved until the crop is empty. Administer daily 30 grains bicarbonate of soda in a tablespoonful of water.

It is, of course, essential to keep the birds quite free of parasites (lice, ticks, &c.).

Provide grit at all times.

Dry mash feeders require unlimited water.

CRATING.

Pack in sound crates, with a close bottom, wire netting sides and top, and, generally, 4ft. x 2ft. 6in. x 1ft. 6in. (high). This will hold 20 to 30 birds, according to size.

Forward to market in cool weather.

For journeys provide ample water accommodation. Place straw on floor of crate.

DUCKLINGS.

The most profitable breed in this State is the Pekin. Aylesburys are very rare, and generally have Pekin blood in them; the cross is excellent. Runners are too small. Muscovy ducks are coming into prominence, and are excellent if killed at 10 weeks or 12 weeks old, Duck fattening needs special care. when they weigh well. youngsters need careful handling, and must be sheltered from the hot sun. Drinking water must be available day and night, or the mortality will be great. Run them in flocks of 25 to 30 until a week or ten days old; then subdivide them into smaller flocks as they grow, and finish with four to six ducklings per pen at seven weeks old. Mash made of bran and pollard, ground grains, &c., mixed with hot water or skim milk, and to the whole add by bulk one-third cut green food. Up to seven weeks give plenty of animal food (meat meal soup, boiled rabbit, livers, &c.), as such is essential to success. From seven to nine weeks leave off green food and meat gradually,

and replace by sweet fat or tallow, 1lb. daily for 40 ducklings. Large supplies of grit (gravel and charcoal) must always be supplied. During hot spells ducklings may refuse their food. To keep them going use flat pans of cool water, and place therein cut green food and a little grain.

CRATING.

Not more than three or four should be in one compartment. Use a crate with several compartments. Otherwise the ducklings climb over one another, and their sharp claws create much havoc. Such damaged birds would be useless for export. Forward in cool weather, if possible, and always provide drinking vessels. Ducklings lose weight on a journey even of a few hours' duration.

GOSLINGS.

Old geese are not suitable for table use, and are as a rule of indifferent flavor. Very seldom are properly fattened goslings seen in our markets—they are generally grass fed, and do not carry the flesh of a good Pekin duckling. They can be got into good condition on much the same food as for ducklings, and will do well on boiled grain and boiled small potatoes added to the mash. They must be kept quiet, and not driven about. Goslings lose weight rapidly if worried, also on a journey. Toulouse and Toulouse cross are the best.

TURKEYS

are always difficult to fatten. In the old pre-fox days large flocks were bred in various localities, and during the summer were generally in good condition through feeding on the stubbles. Turkeys which have roamed at large resent confinement, and often fret and become poor. When poor they take a long time to fatten, as is natural with a bird of such size. Boiled grain and wet mash will give good results, and the birds should be kept as tame as possible. They should be marketed at from five to six months; old birds can be eaten, but the quality is not good.

CRATING GEESE AND TURKEYS.

According to size, three or four birds should be sent in one roomy crate, with ample head room. Head room is essential—overcrowding and cramping will increase the loss of weight which always occurs on a journey. Black Norfolk and White Cambridge are noted for quality of flesh and ease of fattening. The American Bronze is a mammoth, but somewhat difficult to fatten well, and by some is considered inferior in quality. Much, however, depends on the fattener.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, September 8th. The Chairman (Mr. F. Coleman) presided, and others present were Professor Perkins (Director of Agriculture), Colonel Rowell, C.B., Messrs. W. J. Colebatch (Principal of Roseworthy College), G. R. Laffer, M.P., A. M. Dawkins, J. Miller, C. E. Birks, and G. G. Nicholls (Secretary).

REPAIRS TO HARVEST MACHINERY.

A communication was received from the Chief Inspector of Factories stating that instructions had been issued to inspectors of country districts to the effect that, generally speaking, the department did not interfere with manufacturers of machinery or repair shops in the administration of the Early Closing Act. Mr. Bannigan further pointed out that if considered necessary that instruction could be supplemented by a circular directing that supplies should be permitted in all bona fide cases of necessity. The Board decided to request that the suggested circular should be sent out, and that it should be made perfectly clear that no restriction must be placed upon the sale of machinery parts.

STORAGE OF WHEAT.

The committee appointed at the previous meeting to deal with the question of the provision of storage accommodation for wheat at different country centres presented the following report, which the Board adopted for transmission to the Minister of Agriculture (Hon. C. Goode):—"1. The Advisory Board realise that a probable record harvest, coupled with freight difficulties, will have the effect of extending the export of wheat into the rainy season of 1916. Board believe, however, that the enhanced cost of material (timber. galvanized iron, &c.) renders inadvisable the erection of temporary sheds, which would prove more or less superflous in normal seasons. 3. The Board feel confident that merchants and millers will be able to provide for the storage of the bulk of the crop in the ordinary way. 4. The Board recommend that about the month of February next the matter be reconsidered, with a view of ascertaining whether the remaining wheat is sufficiently protected. 5. The Board wish to direct special attention to the inadequate railway facilities on Eyre's Peninsula to carry any considerable quantity of wheat from stations up the line to Port Lincoln or other ports. The effect of this indifferent service and insufficient supply of trucks and power is that the merchants have to bring the wheat to the ports and stack it there, in order that they may have enough to load a vessel when freight is available. This means that the wheat has first to be stacked at the country station or siding, and again at the port, and the double handling charges thus involved are naturally borne by the farmer. On the other hand, if an adequate supply of trucks and power were available, the wheat could be railed straight away from the stacks at country stations to the ship's side. 6. As incidental to the matter referred to the Board by the Minister, we suggest the advisableness of considering the question of Government advances to farmers on wheat, should the disposal of the export surplus prove slower than is generally anticipated."

RAILWAY FARES.

The Secretary was directed to interview the Railways Commissioner respecting a suggestion from the Wilkawatt Branch that cheap excursion fares should be issued (as in normal times in connection with the Royal Show), to enable the country folk to visit the city, and to forward the reply to the Branch.

CONFERENCE AT ROSEWORTHY COLLEGE.

A resolution from the Riverton Branch suggested that a one-day conference of the Branches of the Bureau should be conducted at Roseworthy College toward the end of September, to take the place of "Farmers' Day." Mr. Colebatch intimated that he would be pleased to welcome individual Branches at the College, and show them over the farm, etc., but he did not see how it would be possible to combine a conference with an inspection of the property, especially in a year such as the present. The most suitable days were Thursdays and Fridays. The Board agreed that there would be insufficient time to make an inspection and hold a conference in one day.

SEA FRONTAGE AND RABBITS.

The Carrow Branch desired the Board to use its influence in the direction of inducing the Minister of Crown Lands and the Harbors Board to have the coastline frontage—which varied from 5 chains to 20 chains in width—in the hundred of Dixson cut up and leased to the farmers holding adjoining land, so that it might be cultivated and the rabbit pest thus reduced. At the instance of Mr. Laffer, it was resolved to advise the Branch to approach the authorities through the parliamentary representatives for the district.

RABBITS.

A letter was received from the Ironbank Branch to the effect that, owing to the Park being a splendid breeding ground for rabbits, and the fact that shooting was prohibited on the estate, the owners of ad-

joining land found it difficult to keep the rabbit pest down on their properties. Mr. Laffer asserted that not only did the Commissioners allow shooting and trapping by reputable persons, but he was confident that at present anybody who took a four hours' walk through the park would not find a rabbit. In the summer, it was true, the rodents were in evidence to some extent, but that was because they came there for water. The Board instructed the secretary to reply to the Branch accordingly.

TREES.

Apparently with the object of saving trouble and expense all round, the McNamara Bore Branch asked the Board to arrange if possible for the Woods and Forests Department to supply trees required by members to the secretaries of branches in a single parcel. The recipients, of course, would give a guarantee to look after the trees as at present. It was decided to obtain a report from the Conservator of Forests (Mr. W. Gill) on the matter.

Noxious Weeds.

Arising out of a discussion at the August meeting of the Board, and a question asked by the Hon. J. P. Wilson in the Legislative Council, the Board intimated that while the powers remained in the hands of the local governing bodies it was useless to expect the noxious weeds problem to be effectively grappled with. They considered that the administration of the law should be entrusted to a Government Department—a determination which, it was mentioned, had been emphasised in a report to the previous Government. It was decided to submit that report to the Minister of Agriculture.

FIRE BREAKS.

Mr. Miller strongly recommended all farmers to make adequate fire breaks round crops left for grain this season; otherwise, he said, there was every probability that serious losses would be incurred, on account of the luxurious growth which was everywhere in evidence.

AUSTRALIAN STANDARD CORN SACK.

A letter was received from the Victorian Government intimating that they were entirely in accord with the request made by the Advisory Board, viz., that the standard corn sack, when filled with grain, should be accepted for export, even though in some instances it might slightly exceed the prescribed weight. It was decided to draw the attention of the Minister of Agriculture to the reply received from the Prime Minister, which the Board could not regard as satisfactory.

NEW BRANCH.

Approval was given to the formation of a new Branch of the Bureau at Rosenthal, with the following gentlemen as members:—T. H. Wolf, H. F. Mugg, T. W. Koch, T. G. Eckermann, W. Falling, E. Falling, F. C. Zerk, E. H. Zerk, W. Bergan, A. B. Gursanky, S. Gursanky, C. Harder, C. N. Harder, G. W. Mattiske, G. Rusch, A. Taylor, J. Partridge, T. Arnold, G. E. Heinjus, R. Schrapel, W. Laws, C. W. Hoffmann, — Berman, W. Neuman, L. J. Tuckwell, J. Heinjus, G. H. Stevens.

NEW MEMBERS.

The following gentlemen were approved as members of the Branches shown:—Bookpurnong East—P. R. Marshman, L. B. Kingsborough; Riverton-O. E. Longbottom; Narridy-F. Hiskey, J. C. Reinke; Lucindale—F. R. Secker, W. Natt; Redhill—W. B. Torr, R. Lister; Mount Hope—J. Doudle, W. Doudle; Naracoorte—J. J. Donohue, R. A. Chapman, Alex. Johnstone, W. G. A. Hennig; Meadows-E. A. Halliday; Coorabie—C. Winterfield, W. G. Wheadon; Salt Creek— W. T. Lee, jun.; Keith—H. Donnell, B. Mogg; Miltalie—D. P. Bagnell, H. Bagnell; Lyndoch—H. O. Goercke; Netherton—P. C. Potter; Balaklava—C. J. Simmonds, E. J. Lange, E. Finlayson, K. Neville; Hookina—F. Cagney, G. Henschke; Wepowie—F. W. Churcher, P. Burns, jun.; Mypolonga—F. C. Staff, G. R. Traeger, W. M. McAuliffe; Mount Barker—H. J. Dunn; Leighton—R. J. C. Flower, W. Reynolds; Woodside—E. H. Lauterbach, H. Nickels; Myrla—C. W. Weiss, P. A. Ziersch; Murray Bridge—Tornquist, W. Squires, E. A. Kuchel, F. Schottelius, G. Love, G. Opie, — Spackman, J. Lysaght, J. W. Baldock; Spalding—J. Campbell, M. Campbell, L. Llewellyn, M. McCarthy; Yadnarie—F. H. Harris; Wirrega—J. Purdie, C. Meier, C. H. Williams; Glencoe—J. T. Carthew, F. W. Koop; Monarto South—M. Nolan, B. Bormann, T. Bretag, B. Scheischer; Blyth— F. B. Turner; Warrow-F. S. Mitchell, S. Carrick, H. Langsford, J. G. Puckridge, W. W. Doudle, R. T. Howson, jun.; Halidon— P. J. W. Clonan, H. F. R. Huppatz, A. H. Tilbrook; Mount Compass— A. Dorrell, W. G. Hicks, A. Borrers; Crystal Brook—L. G. Story, D. Smallacombe; Amyton-W. Ryan, B. V. Schulz; Milang-H. Howard, G. Rankine, J. J. Findlater; Borrika—H. J. Stephens; Northfield—W. Hogan; Blackwood—J. L. Light; Mindarie—J. E. Fullstone, A. R. Hoskin, J. G. Lowe, M. R. Beckwith; Tintinarra— C. Wylie, H. A. Brooks; Ramco—W. Cates, J. Irrgong, G. Rogers; Hilltown—V. Brabbick, A. A. Lehmann, J. Gray, A. Threadgold; Coomooroo—N. Lillecrapp, C. Fogden, M. Avery, L. Toholke.

THE WHEAT MARKET.

Local wheat prices remain nominally at 7/6 to 7/9 for f.a.q., on trucks, Ports Adelaide, Pirie, and Wallaroo.

Advices are to hand of the delivery of the first of the new season's wheat. The appearance of this will be watched by farmers with particular interest.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on October 1st:-

BUTTER.—Excellent rains were experienced throughout the month of September, and the production of butter further substantially increased. Values receded slightly, but maintain firm at the prices recorded at the end of the month, when "Alfa" was 1s. 4d.; "Primus," 1s. 3d.; choice separators and dairies, 1s. 1½d. to 1s. 2½d.; store and collectors, 11½d. to 1s. 1d. per lb.

Eggs.—The quantity of eggs coming forward was much larger than was anticipated a month ago, but rates maintained well owing to the fact that picklers and others have operated extensively in order, at any rate, to make certain of portion of their future requirements. Closing prices were:—Hen, 1s. 1d. per dozen; duck, 1s. 2d.

CHEESE.—Values have fluctuated considerably in cheese, the easing at the beginning of the month being followed by subsequent firming with outside markets purchasing here. Present quotations:—10d. to 10½d. per lb. for large to loaf.

BACON.—There is quite a dearth in this line in the absence of importations and the shortage of the live hog in South Australia. Factory-cured sides are selling at 1s. 3d. to 1s. 4d. per lb.; hams, 1s. 4d. to 1s. 5d. per lb.

HONEY.—No new season's has yet come along, and market is firmer at 5d. to 5½d. per lb.; beeswax, 1s. 5d. per lb.

Almonds continue scarce; Brandis, 8d.; mixed softshells, 6½d. to 7d.; hardshells, 3d.; kernels, 1s. 4d. per 1b.

LIVE POULTRY.—Supplies throughout the month have been very short indeed, which has caused disappointment to buyers, so that each lot has been eagerly competed for, and record rates secured; and good prices are likely to rule from now on to Christmas. Good table roosters, 4s. 3d. to 4s. 9d. each; nice-conditioned cockerels, 3s. 9d. to 4s. 3d.; plump hens, 3s. 6d. to 4s.; ducks, 3s. 3d. to 4s. 3d.; geese, 5s. to 5s. 6d.; pigeons, 10½d. to 1s.; turkeys, from 1s. to 1s. 2½d. per 1b. live weight for good to prime table birds.

POTATOES AND ONIONS.—A few truckloads of South Australian grown potatoes were handled during the past month, but the bulk of our requirements was drawn from Victoria, and therefore prices have been governed by the Melbourne market. Onions have offered very freely, and quotations eased considerably. Potatoes, 59 to £10 per ton on trucks Mile End or Port Adelaide; onions, £8 per ton on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of September, 1915, also the average precipitation to the end of September, and the average annual rainfall.

Station.	For Sept., 1915.	To end Sept., 1915.	Av'ge. to end Sept.	Av'ge. Annual Rainfall	Station.	For Sept., 1915.	To end Sept., 1915.	Av'ge. to end Sept.	Av'ge. Annual Rainfall
FAR NORTH	AND U	Jeper 1	Vortн.		Lower N	ORTH-	continu	ed.	
Oodnadatta	0.21	1.31	3.70	4.76	Spalding	3.77	17.83	16.17	20.25
Tarcoola	0.51	3.02	5.87	7.58	Gulnare	2.57	15.33	15.78	19.74
Hergott	0.83	3.04	4.64	6.04	BundaleerW.Wks.	3.27	15.93	13.63	17.29
Farina	1.02	3.73	5.20	6.70	Yacka	2.30	12.22	12.37	15.27
Leigh's Creek	1.40	3.58	6.90	8.66	Koolunga	2.30	11.66	12.89	15.94
Beltana	1.32	4.95	7.22	9.22	Snowtown	2.63	14.87	12.84	15.70
Blinman	0.97	6.52	10.37	12.85	Brinkworth	3.07	13.90	12.59	15.48
Hookina	1.97	9.59			Blyth	2.83	14.51	13.31	16.34
Hawker	2.54	10.48	9.71	12.22	Clare	5·48	23.12	19.85	24.30
Wilson	2.58	9.26	9.41	11.78	Mintaro Central .	6.02	27.87	17.81	21.99
Gordon	2.85	7.80	7.98	10.26	Watervale	5.17	25.85	22.22	27.17
Quorn	2.79	10.81	11.03	13.78	Auburn	4.67	22.82	19.78	24.25
Port Augusta	2.20	7.48	7.48	9.46	Hoyleton	2.46	14.01	15.20	17.96
Port Augusta W.	2.14	7.73	7.41	9.36	Balaklava	2.32	13.01	12.81	16.03
Bruce	2.26	8.00	7.95	10.01	Port Wakefield	2.09	11.41	10.28	13.13
Hammond	2.55	8.27	8.96	11.46	Terowie	2.27	9.36	11.56	13.71
Wilmington	3.42	16.54	14.75	18.26	Yarcowie	2.44	10.55	11.97	13.91
Willowie	2.20	9.58	9.51	11.90	Hallett	2.44	13.79	13.29	16.40
Melrose	4.66	20.41	8.78	23.04	Mount Bryan	3.58	16.47	12.83	15.73
Booleroo Centre	2.80	10.85	12.71	15.83	Burra	3.42	18.63	15.35	17.82
Port Germein	1.71	11.19	10.18	12.84	Farrell's Flat	4.08	18.63	15.39	18.87
Wirrabara	4.43	20.13	15.31	18.91			1	,	1
Appila	2.49	10.63	11.86	15.08	West of	Murra	y Rano	JE.	
Cradock	1.67	7.68	8.49	10.86	Manoora	3.86	17.70	14.62	118-09
Carrieton	2.57	10.54	8.98	$ \begin{array}{c c} 12.22 \\ 10.21 \end{array} $	Saddleworth	3.65	20.59	15.95	19.69
Eurelia	1.79 1.80	6.94 10.26	7.32	13.24	Marrabel	4.13	21.42	15.33	18.94
Orroroo	2.19	9.50	10.45 10.64	13.42	Riverton	4.04	22.46	15.64	20.48
Black Rock	2.27	8.99	9.57	12.25	Tarlec	4.37	21.04	13.93	17.48
Petersburg	2.32	10.04	10.18	13.07	Stockport	4.13	19.60	12.66	15.89
Yongala	2.77	12.27	10.85	13.94	Hamley Bridge	2.96	17.16	13.21	16.45
			10 00	1001	Kapunda	3.80	20.14	17.88	19.67
I	NORTH-	EAST.			Freeling	2.95	16.98	14.27	17.85
Ucolta	1.77	7.58			Greenoek	4.10	21.26	17.12	21.46
Nackara	1.25	8.24			Truro	3.46	19.78	15.98	19.74
Yunta	0.93	3.78	6.15	8.22	Stockwell	3.36	20.04	16.25	20.30
Waukaringa	0.86	4.54	6.07	7.94	Nuriootpa	4.06	19.69	17.13	21.25
Mannahill	1.33	4.01	6.22	8.46	Angaston	5.25	24.24	17.90	22.25
Cockburn	1.54	3.93	6.08	7.97	Tanunda	4.51	21.27	18.05	
Broken Hill, NSW	2.05	7.06	7.40	9.63	Lyndoch	5.14	22.87	19.89	23.01
T,a	OWER N	OBTH		`	ADEL	AIDE P	LAINS.		
Port Pirie	2.09	11.52	111.62	13.21	Mallala	2.88	14.89	13.65	116.88
Port Broughton .	2.24	12.43	11.68	13.33	Roseworthy	4.81	19.05	13.92	
Bute	2.45	13.69	12.77	15.42	Gawler	3.96		15.58	1
Laura	3.27	14.99	14.58	18.22	Two Wells	2.20	11-97	13.37	
Caltowie	2.60	12.16	13.60	17.27	Virginia	2.30	14.53	14.30	
Jamestown	3.80	15.94	13.75	17.46	Smithfield	2.06			1
Gladstone	3.49	13.32	12.67	16.00	Salisbury	2.77		1	
Crystal Brook	2.90	12.34	12.51	15-62	North Adelaide	3.98		17.59	
Georgetown	3.25	14.00	14.77	18.32	Adelaide	3.57	18.32	17.32	21.04
Narridy	2.38	13.59	12.59	16.79	Brighton	4.37			
Redhill	2.27	12.29	14.71	16.79	Glenelg	3.25	18.05	15.13	18.35
		<u></u>				1		1	1

RAINFALL-continued.

			RAI	NFALL	-continued.				
Station.	For Sept., 1915.	To end Sep*., 1915	Av'ge. to and Sept.	Av'ge. Annual Raintall	Station.	For Sept., 1915.	To end Sept , 1915.	Av'ge. to end Sept.	Av'ge. Annual Rainfall
ADELAIDE	PLAIN	s-cont	inued.		West of Spei	CER'S	GULE-	continue	ed.
Magill	4.21	24.08	22.28	25.69	Streaky Bay	0.57	13.17	13.33	15-31
Glen Osmond	4.77	26.05	20.74	25.20	Port Elliston	1.79	16.39	14.24	16-49
Mitcham	4.24	25.22	19.47	23.47	Port Lincoln	3.66	18.98	17.02	19.88
Belair	1	17.83	23.86	28.64	Tumby	2.39	12.42	12.56	15.00
De Roll		1	1 -0 00	1 01	Carrow	1.79	12.58		1000
Mouna	LOFT	RANG	ES.		Cowell	0.71	12.19	9.48	11.76
	5.04	25.49	23.13	1 28-19	Point Lowly	1.18	8.91	9.56	12.21
Teatree Gully	10.28	51.54	38.94	46.70		1			4
Stirling West	9.13	52.14	37.27	44.35	***				
Uraidla	6.90	29.80	27.93	33.67	YORKI	s's Pei	NINSULA	•	
Clarendon Morphett Vale	1.44	20.43	19.07	23.32	Wallaroo	1.21	11.90	11-64	14.05
Noarlunga	4.03	20.24	16.92	20.28	Kadina	1.85	14.02	13.28	15.88
Willunga	4.09	18.52	21.67	25.98	Moonta	1.64	13.28	12.63	15.22
Aldinga	3.40	17.31	16.95	20.34	Green's Plains	2.63	15.18	13.67	15.73
Normanville	3.24	18.75	17.23	20.65	Maitland	2.98	20.45	16-61	20.08
Yankalilla	4.22	21.54	19.41	22.78	Ardrossan	1.81	13.09	11.44	13.89
Cape Jervis	2.59	10.89	13.75	16:34	Port Victoria	2.31	14.74	12.61	15.20
Mount Pleasant .	6.25	28.11	22.29	26.87	Curramulka	2.52	18.24	15.31	18.51
Blumberg	7.55	29.73	24.41	29.38	Minlaton	3.22	19.69	14.53	17.41
Gumeracha	7.09	32.47	27.41	33.30	Stansbury	3.20	16.87	14.17	17.06
Lobethal	8.40	37.61	29.62	35.38	Warooka	3.02	16.52	15.06	17.71
Woodside	8.29	37.28	26.19	31.87	Yorketown	2.68	14.48	14.57	17.47
Hahndorf	6.91	32.47	29.41	35.45	Edithburgh	2.73	16.51	13.68	16.48
Nairne	5.84	28.56	24.84	28.83					
Mount Barker	7.64	33.44	25.57	30.93	South A	NTO SOF	rener . R. a e	ım.	
Echunga	6.51 6.94	33.75 30.72	27.27	$32.83 \ 30.72$	South A	ייסט מא	1H-13A	11.	
Macclesfield	8.81	40.97	25·28 29·29	35.52	Cape Borda	4.69	23.97	21.83	25.09
Meadows		17.53	15.81	19.28	Kingscote	3.74	17.54	16.04	18.95
Strathalbyn	0.30	11.56	10.01	19-20	Penneshaw	2.78	16.13	18.09	21.34
Mann en	Cr ma	. 37.			Cape Willoughby	3.59	19.02	16.34	19.69
MURRAY .			TTEX.		Victor Harbor	3.15	16.35	18.44	22.18
Wellington	2.27	12.17	11.90	15.01	Port Elliot	2.84	13.54	16.85	20.33
Milang	1.44	10.42	13-19	16.08	Goolwa	2.57	14·28 11·45	14.82	17.93 16.74
Langhorne's Brdg	1.84	9.75	13.20	15-27	Pinnaroo	2.63 2.08	10.84	14.32	10.74
Tailem Bend	1.94	11.00	11.40	1	Lameroo	2.89	12.98	12.94	16.55
Murray Bridge	1.78	9.27	11.42	14-32	Parrakie	1.72	11.47	12.77	1000
Callington	$\frac{2.37}{1.55}$	13.05 7.92	12.77 5.45	15.65 11.67	Geranium	2.09	12-19		*******
Mannum	3.60	14.07	12.53	15-60	Peake	2.25	12-15		
Palmer	2.84	11.16	9.63	11.02	Cooke's Plains	2.58	13.34	11.83	14.74
Blanchetown	0.79	5.48	8.28	10.71	Meningie	2.89	12.24	15.56	18.87
Eudunda	3.34	17.48	13.92	17.33	Coonalpyn	3.17	13.75	14.03	17.49
Sutherlands	1.63	9.85	8.36	10.60	Tintinarra	3.39	15.00	15-11	18.78
Morgan	1.14	6.51	6.95	9.29	Keith	2.50	13.07		
Overland Corner .	1.31	6.06	8.59	11.42	Bordertown	3.27	14.96	15.53	19.76
Renmark	1.76	7.42	8.99	10.93	Wolseley	4.40	17.38	13.92	17.72
Loxton	1.91	8-43			Frances	4.17	17.17	16.03	20.74
				`	Naracoorte	4.32	22.15	18.06	22.60
West of	SPENO	ER'S G	TT.R		Penola	4.58	23.51	21.49	26.78
				1 20 20	Lucindale	4.63	21.85	19-10	23.32
Eucla	0.53	7.36	8.36	10.13	Kingston	4.39	22.56	20.63	24.73
White Well	0.69	5.96	7.48	9.67	Robe	3.51	21.36	20.91	24.69
Fowler's Bay	0.84 0.86	12·19 12·32	10.45	12-11	Beachport	4.88	24·26 29·57	23.40 24.53	27.51 29.25
Penong	0.68	8.22	9.97	11.93	Mount Gambier	5.08 4.89	30.06	25.77	32.00
Murat Bay Smoky Bay	0.54	9.39			C. Nrthumberland	3.80	24.38	22.06	26.63
DIMORA Day	1	1 000	1	\ _	O. Miniminelland	9.00	#T-00		-0.03
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AGRICULTURAL BUREAU REPORTS.

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Jute	1 1	_		Kingscote		5	
Butler	†		~	Kingston-on-Murray.	1 1		-
Caltowie	*	16	20	Koonibba	3 -0-5	21	1
Canowie Belt				Koppio	1 1		-
Jarrieton	311	21	18	Kybybolite	†	21	1
Jarrow	324			Lameroo	328-34		-
Cherry Gardens	336	19	16	Laura			-
lanfield	326			Leighton	312	21	-
Clare	‡	22	19	Longwood	1		-
Slarendön	Į Į			Loxton	*		-
Claypan Bore	326	18		Lucindale	: 6	30	-
Colton	325	23	20	Lyndoch	1	21	-
Doomandook	326		-	MacGillivray	安		-
Coomooroo	309		-	Maitland	†	7	1
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Coonawarra	#			Mangalo	*		-
Coorabie	318-9			Mantung	334		i -
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Dawson	*			Millicent	*	12	
Denial Bay	*		_	Miltalie	320-1	23	1 9
Dowlingville	+		_	Mindarie	3:29	11	.
Elbow Hill	320-5	23	20	Minlaton	*	21	
Forest Range	336	21	18	Mitchell	**	23	1 :
Forster	327	23	20	Monarto South	3 29	_	1
Frances	*	22	19	Monteith	*		
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^{*}No report received during the month of September. + Formal report only received.

‡ Held over until next month.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—October 14th and November 10th, 1915.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by H. J. Finnis.

UPPER-NORTH DISTRICT, (PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82in.). August 24th.—Present: eight members and three visitors.

SHEEP ON THE FARM.—The following paper on this subject was read by Mr. R. Gum:-"Even the smallest farmer should not neglect to keep a few sheep. In addition to providing the mutton supply, and returning a considerable profit in the wool, they keep all weeds down on fallowed ground. Thus they save the farmer a considerable amount of time in working his land over two or three times to destroy the weeds. During the time they are kept for this purpose their wool is growing and they are putting on meat, which is valuable at the present time. The most suitable class of sheep for this country is the Merino—that is, if the farmer is going in for wool. These animals are not so difficult to keep inside the fences as the crossbreds, and the wool return from any rejected for export is greater in the case of the former. I prefer the lambraising to wool-growing for this year, as there is a bigger demand for meat than wool, therefore I think the farmer will gain more from fat lambs than by holding them over till the following year. If the lambs are held through the summer the flock becomes too large, and cut up the dry feed during the summer months. This we should try to avoid, as the land is liable to drift as soon as the feed becomes scarce. Should the lambs be held over till the following season, and the season breaks up late, they will not have a chance to get fat until late in the season. If the farmer is going in for lamb-raising for export purposes only, I would then advise him to mate the Merino with the Shropshire ram, as the crossbred grows much more quickly and larger than the pure Merino. The rams should be put with the ewes in December. The lambs would then be dropped in May and June—the most suitable time in this district, as green feed is generally available by them. The number of sheep kept should be determined by the season, but we should be careful not to overstock. The ewes should be from 2 to 5 years old, and close-woolled. I prefer the plain-bodied sheep, as they are much easier to shear, and do not collect the seeds to such an extent. Lambs should be tailed between the age of 14 days and two months. The knife is far superior to the searing-iron, as the The warm, windy day is the most suitable for this cut heals more quickly. operation, as the lambs are not then troubled with the cold or flies. Shearing should be done at the end of September or the beginning of October, as the cold weather is generally over by then, and the sheep are free from seeds at that time. In conclusion, I would advise every farmer who has not already had experience with sheep to go in for a fy, as he will be rewarded for the little trouble involved."

BEAUFORT.

August 19th.—Present: eight members.

MIXED FARMING.—In a paper dealing with this subject, Mr. S. Underwood took for an illustration a farm of 750 to 800 acres. One-third of this area, he said,

should be cropped, one-third fallowed, and the remainder left out for feed. One man, a knockabout hand, and a team of eight horses should be able to do the work involved. From 150 to 200 sheep could be carried, a few lambs being raised for market and for household purposes. Two or three foals should be raised annually to take the place of losses in the team. Three or four cows should be timed to come in about April or May, and be dried off toward the end of the summer. Calves, pigs, and poultry should also be reared. Mr. Mugford, whose opinions accorded with those expressed by the writer of the paper, mentioned the wisdom of keeping sheep of good quality. He thought it better for the farmer to put the man on the team, and do the knockabout work himself. Mr. Marr also agreed with the opinions of the writer of the paper.

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

August 23rd.

FARM MANAGEMENT.—In a paper dealing with this subject, Mr. F. Bartrum id:—"In this district, where holdings are on the small side, and where

said:- "In this district, where holdings are on the small side, and where cropping every other year is the practice, a good deal more labor is required to keep down rubbish, and also a heavier dressing of super. than where the three-year system can be worked. Fallowing should be commenced as soon after seeding as possible, as fallowing done in the earlier winter months usually gives better results than that done later in the season, and also allows more time for working. In this district, where the ground is uneven and in places stony, the four-furrow plough is quite large enough, as success does not depend upon the amount got over, but upon the way in which it is done. No hard and fast rule can be laid down as to depth; this is usually governed by the different classes of soil, but, as far as my experience goes, the best results are obtained from 3in. or 4in. When fallowing is finished, the land should be well broken down with a heavy set of harrows, to conserve moisture and to promote the growth of weeds. During the spring months is the ideal time for working back fallow, upon which so much depends. I prefer the skim plough for the first working, as with this work can be done more evenly, with a better chance of cutting all weeds. Later in the season stray weeds which survived should be kept down with the cultivator, combined with the liberal The next item, which is quite as important as any, use of the harrows. is the selection of seed, which often does not receive as much attention as it The farmer should note carefully the varieties which give the best results; three or four varieties are quite enough. These should be true to name. and well graded, so that nothing but the best is sown. A little extra time spent in this way will be well repaid at harvest time. There are various methods of pickling in vogue as a preventive against smut, the most commonly practised being the dipping of the sack into a cask containing a solution of 11b. of bluestone in 10galls. of water, but the trouble with this method is to keep the solution at the right strength. I consider the most thorough way is the old style of floor pickling. The wheat should be emptied on to a cement floor and the bluestone sprinkled over it. The grain should be turned over three or four times with a shovel, care being taken to sweep in all outside grains, so that none escape being well damped. The time of seeding is usually governed by the nature of the season. It is a general practice to wait for rain before sowing, so that all rubbish can be killed and a better seedbed procured than if put in when When sowing dry I consider it advisable to roll with a good heavy roller, as this helps to consolidate and compact the soil, thus improving the seedbed. The best implement for seeding purposes is undoubtedly the tine cultivator, worked at a fair depth. This leaves a fairly even surface for the seed drill. advisable to harrow after sowing if possible. The quantity of grain sown varies according to the different varieties of seed. With early varieties, such as Gluyas, King's Early, and Bunyip, bushel and a half is not too thick, and the later varieties vary according to the time of sowing. The land should be dressed with 1cwt. of super per acre. I prefer the complete harvester to the reaper and winnower. All implements should be kept under cover, and should be thoroughly overhauled before being put away, and any breakages or worn bearings should be noted and replaced. It is advisable to breed sufficient stock for working the farm; these should be bred from the best mares mated with the best sire available, as a little extra expense in this way is easily repaid in

the quality of stock procured. Enough sheep should be kept on the farm to keep down weeds on the fallow, but overstocking is to be avoided. Cattle, pigs, and poultry are a regular source of income, and should always be found on the up-to-date farm."

IMPLEMENTS.—In a short paper, Mr. C. C. Cox recommended the following implements as most suitable for this district:—Four-furrow plough for fallowing, stump-jump harrows for working fallow, twin cultivator for destroying rubbish, and the spring-tooth cultivator to be worked in front of the drill for destroying the small weeds. The disk drill was not suitable for the rough land. Seed wheat should be cleaned with the aid of the winnower, and additional screens.

COOMOOROO (Average annual rainfall, 11in. to 12in.). August 26th.—Present: nine members and three visitors.

SPARE TIME.—Mr. N. S. Lillecrapp read a paper, in which he urged farmers to utilise their spare time in such ways as repairing implements, harness, etc., and in the manufacture of small woodwork requirements of the farm and homestead. The rudiments of masonry, he said, were easily picked up, and a knowledge of these would prove useful. A soldering outfit would find a great deal of use. In discussing the subject Mr. R. Polden expressed the opinion that farmers should be capable of undertaking small repairs in the way of blacksmithing.

DAVENPORT (Average annual rainfall, 9in. to 10in.). August 26th.—Present: six members.

Water Conservation and Irrigation.—Mr. A. Bothwell, in a paper bearing this title, referred at length to an article which appeared on page 555 of the February issue of the Journal, entitled "Fodder Crops on Reclaimed Land." He expressed the opinion that provision for storage of the waters of the Murray for irrigation and navigation would prove an inestimable boon to settlers, enabling them to increase the production of their holdings, and at the same time provide a reliable and cheap means of transport for produce. He then made reference to the achievements of other countries in the direction of water conservation, and the results by which they had been attended. There were many streams in South Australia, he said, which occasionally "ran a banker," and a vast amount of these flood waters could be impounded and utilised for irrigation.

HOOKINA (Average annual rainfall, 12in.). August 24th.—Present: 11 members and two visitors.

Care of Sheepskins.—Mr. J. Hensehke contributed a paper on this subject. He said that, owing to careless handling on the farms, about 20 per cent. of the skins received at the Adelaide market were damaged, with the result that an annual loss of approximately £10,000 was incurred. With care, a great proportion of this loss could be avoided. Wherever possible, the sheep should be killed on a grate, so that the blood would run away, and leave the skin clean. After the legs were skinned the sheep should be hung up and opened down the belly, enabling the skin to be removed. Skins should always be dried under cover, hung lengthwise over a rail. It was most important to take precautions to prevent the infestation of the skins with weevil. Preparations for this purpose could be cheaply obtained from any skin broker.

MORCHARD (Average annual rainfall, 11in. to 12in.). August 21st.—Present: 13 members and one visitor.

CHAFFCUTTING.—The following is taken from a paper written by Mr. E. J. Kitto:—"A good chaffing plant is very necessary on every farm. Engine power is preferable to horse power for cutting chaff, but if little chaff is required the horse-power plant may do. In fixing down the plant, should it be either engine or horse power, it is best to put it so that the belt will draw the knife on to the work; that is, the belt should be worked on the same side as that on which the feeder stands. By this means the knife will always be brought to its work, and wear that takes place in the bearings will bring the knife towards the mouth of the cutter. If engine power is used 350 to 370 revolutions of the knife wheel per

minute will not be too much provided there is sufficient power in the engine to drive it. In order to turn out a good sample the knives must be properly set. The belt should be put on, and the knives then set so that they will just graze lightly but evenly on the mouth of the cutter. If the knives are then kept in a sharp condition a good sample of chaff will be the result. All binder string should be taken from the hay before it is passed through the cutter. Just lately I have noticed reports of the deaths of both horses and cattle, caused, it was said, through their eating binder string that had been chaffed up with the hay." Mr. W. Toop, in discussing the papear, expressed a preference for engine power for chaff-cutting. The Chairman (Mr. B. S. McCallum) advised putting 2cwts. of water on each ton of chaff 12 hours before chaffing. Messrs. R. Jasper and Collins also spoke. [On reference to p. 56 of the August issue, it will be seen that anyone who sells chaff in which binder twine is found is liable to be proceeded against.—Ed.]

MOUNT REMARKABLE (Average annual rainfall, 23.04in.). September 1st.—Present: 19 members.

Bulk Handling of Wheat.—In a paper on this subject, Mr. W. J. Oldland referred to the changes in practice which would be involved if the system of bulk handling were introduced. Where a farm was situated at a distance of one day's journey from the nearest port or railway station, two box wagons would be required for the carting of the wheat crop; one to be available in the field for loading, and the other on the road. This would require the possession of additional teams, as under present circumstances, all carting of wheat was delayed until the conclusion of the harvest. If it were intended to store the wheat on the farm until after harvest, a large portable granary would have to be provided. This, with the necessary elevating machinery, would be an expensive item. The use of bags for conveying wheat to the station or port, there to be emptied, would not be economical, as the wear and tear on the bags would be considerable. The discussion on the paper was postponed until the next meeting of the Branch.

TARCOWIE (Average annual rainfall, about 15½n.). July 21st.—Present: 11 members.

Fencing.—In a paper on this subject, Mr. C. A. Kotz emphasized the need for good fencing. He recommended a fence of five plain and one barbed wires. Split posts, Sin. at the bottom end and 6in. at the top end, should be put not less than 20in. in the ground. They could be placed 30ft. apart, with two T iron droppers intervening. The first wire should be 6in. from the ground, and the second, third, and fourth wires should also be 6in. apart. The fifth wire should be 7in. from the fourth, and the barbed wire should be fixed to the top of the posts. Strainers should be placed at about every thirty-fifth (including droppers) post, and should be 36in. in the ground. Corner posts should be 36in. in diameter, and should be put 4ft. in the ground. In discussing the paper, Mr. J. P. Smith criticised the value of droppers, as cattle lifted them out of the ground. He recommended the use of all wooden posts.

WARCOWIE (Average annual rainfall, 12.16in.). August 28th.—Present: seven members and two visitors.

Restocking Holdings in the North.—Mr. C. Hilder, in introducing a discussion on this subject, said the price of store sheep was so high that to purchase, except for the purpose of reselling in a short time, was quite out of the question. He suggested that those farmers who had ewes should rear two lambs from each during the year. Whilst the ewes would not produce the same quantity of wool that they would under ordinary circumstances, the value of the extra lamb raised more than compensated for this. Mr. J. Feineler said the position was even more difficult in the case of big cattle. It was necessary for northern farmers to go to the extreme south of the State to fulfil their requirements, the result was the cost of transit amounted to almost as much as the price of the animal. A resolution was carried to the effect that the Branch was of the opinion that special concession rates should be allowed on breeding stock, especially bulls and stallions, travelling on rail to Upper Northern farmers.

ARDEN VALE AND WYACCA, July 26th.—Mr. M. Echert, in a short paper, dealt with the necessity for making ample provision for fodder for stock during times of shortage. Whilst it was probable that most farmers would cut sufficient hay

during the coming season to provide for two years' feed, he said it would be wise for them to cut and head portion of the crop; headed straw, with equal quantities of wheaten hay, provided excellent feed.

CARRIETON, August 26th.—Mr. Kaeger read a paper dealing with various farm operations and methods, and a discussion followed, particular attention being paid to the practice of utilising farmyard manure on barren patches, a treatment generally approved of by members. Members reported that wheat crops and pasture were looking very well, and stock were in good condition.

MOUNT REMARKABLE, July 28th.—The subject of the co-operative purchase of machinery, &c., by members of the Agricultural Bureau Branches was dealt with in a paper by Mr. N. S. Giles, B.Sc.

WILLOWIE, September 3rd.—The subject of "Co-operation" was introduced by the Hon. Secretary (Mr. W. P. Foulis) and some discussion took place. The annual election of officers for the forthcoming year was also held, and the membership roll of the Branch revised.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BELALIE (Average annual rainfall, 16in. to 17in.). August 25th.—Present: nine members and two visitors.

Bulk Handling Wheat.—This subject was dealt with in a paper by Mr. Syd. Napper. The adoption of this system, he said, would do away with the sailing ship for carrying wheat, as these vessels were unable to carry wheat in bulk. From Rosario, in South America, grain was exported in bulk and in bags. He referred at length to the Board of Trade regulations regarding the sea carriage of grain, and enumerated the alterations that would be necessary in present handling arrangements in the event of the system being introduced. He quoted from the Journal of October, 1914, figures relating to the estimated cost of erecting an elevator at the Outer Harbor. In many ports in England, he said, grain that had been carried in bulk on the ship was bagged in the hold before it was discharged. Messrs. Warner, O'Leary, Gulledge, and Dunstone took part in a discussion on the subject.

BUNDALEER SPRINGS.

August 18th.—Present: 12 members and three visitors.

Pickling Seed Wheat.—In a paper on this subject, Mr. Jas. Lawrie deprecated by realized of visibility good, wheat provided that earn year taken in the selection of

the value of pickling seed wheat, provided that care was taken in the selection of seed. He believed that if good, clean seed, free from smut, was sown under favorable conditions, little harm would result if the seed was sown without pickling. In discussing the paper, Mr. M. O'Dea favored dry sowing without pickling, but when sowing in wet ground he said that the seed should always be pickled. He recommended pickling of seed by shovelling it on a floor with the solution. Mr. P. Kerin supported the practice of pickling seed in every case. Mr. F. C. Giles also spoke.

HILLTOWN.

July 16th.—Present: 17 members and one visitor.

Provision of Winter Fodder.—In a paper on this subject, Mr. S. Michael suggested the utilisation of small paddocks of two to five acres in extent, of black soil, for the provision of winter feed. The soil should be heavily dressed with stable manure, fallowed to a depth of 4in. or 5in. in winter, and cultivated and harrowed in the spring to destroy weeds and conserve moisture. The ground should be again worked up in March, and if at all lumpy, should be rolled, or otherwise worked down. From 80lbs. to 100lbs. of barley, together with from 70lbs. to 80lbs. of super. should be cross-drilled immediately sufficient rain to ensure germination fell. Land so treated should be capable of yielding crops for two or three successive years. Members generally agreed that barley was the best cereal for early green feed.

HILLTOWN.

August 13th.—Present: 13 members and seven visitors.

FARM BUILDINGS.—Mr. W. H. Jettner contributed a paper on this subject. He said that the farm buildings should be erected on a site as near to the centre of the farm as circumstances would permit. The stables should be located a short distance from the house, and preferably on a well-drained piece of land. The opening of the stable should face either north or east. All buildings should be of stone, with galvanized iron roofs. Water supply for stock should be available in troughs, which should be about 10 chains away from the stable. All paddocks should be fenced, and be of easy access from the homestead. Mr. Jettner outlined a plan of a stable which he contemplated erecting on his property. In discussing the paper, the majority of members favored leaving horses loose in the yard in preference to stalling each animal by itself. Some members thought that the water troughs should not be more than three chains from the stables.

LEIGHTON (Average annual rainfall, 16in. to 17in.). September 16th.—Present: 15 members and three visitors.

Conservation of Hay.—In a paper on this subject, Mr. Hams said that with the prospects of a good hay harvest before them, farmers might be apt to disregard the experiences of the recent drought. A stack of hay was always an asset, and it was a wise step to make adequate provision for all possible contingencies in regard to shortage of stock feed. Waste of hay from the stack, due to neglect in protecting the contents, should be guarded against. Overfeeding of stock should be avoided by studying the question of food rations. In discussing the paper, Mr. A. E. McWaters recommended the thatching of haystacks, but members favored covering the stacks with layers of straw and covering with wire netting. It was thought that mice caused less loss when the hay was cut when a little green.

MOUNT BRYAN (Average annual rainfall, 15.81in.). August 27th.—Present: six members.

MIXED FARMING.—Mr. Quinn read a paper on this subject. He said that to carry on mixed farming a fairly large holding was required, say, an area of about 600 acres. Eight working horses and one trap horse were necessary, and a pony would also prove very useful. A five-furrow plough and 15-tine cultivator were the most useful implements of their class, and he strongly recommended the use of a 20-hoe drill, which could be drawn by five horses, leaving the remaining three available for harrowing. On stony ground stump-jump harrows would be found very suitable and economical. He would not advise the taking up of dairying unful profit during the summer months. The conservation of fodder was a matter of very great importance. It was advisable to stack all available straw. Chaffed straw treated with molasses, would keep stock in very fair condition. Sheep could well be kept on such a farm, say 100 Merino ewes, mated with two Lincoln rams. This cross produced a fine type of lamb. In addition 50 good wethers could be kept for ration purposes. With an area of 600 aeres available, 200 could be cropped, 200 fallowed, and 200 allowed to lie out each year.

NARRIDY (Average annual rainfall, 16.79in.). August 28th.—Present: 12 members.

Farm Implements.—The Chairman (Mr. M. Reynolds) contributed a paper on this subject. He emphasized the need for careful judgment in the purchase of implements. Farmers should satisfy themselves that the implement which they contemplated purchasing was capable of doing the work for which it was required. It was very important, also, to select an implement the fittings of which could easily be secured at short notice. The housing of implements and machinery should receive proper attention; the provision of a properly roofed and closed in shed would materially lengthen the life of the machinery which it housed. Before harvest time all harvesting machinery should be thoroughly overhauled so that operations could proceed without delays caused by breakdowns in the machinery. The value of painting as a preservative was not properly recognised by the farming community. The woodwork of implements, and more particularly drays and wagons, would remain in service much longer if treated occasionally with a coat of paint. In discussing the paper, Mr. Satchell referred to the necessity for patronising new inventions and improved types of farming machinery, and emphasized the value of

field trials in this connection. Mr. Smart suggested the use of linseed oil as a preservative instead of paint. He thought it wise to buy the popular types of implements, as they could, if necessary, be more profitably disposed of. The Chairman (Mr. Reynolds) in reply to questions, said it was not necessary to loosen the bolts of implements when putting them away in sheds, provided that proper protection was afforded. In regard to field trials, due regard should be given by the judges to durability and mechanical construction.

ENSILAGE.—In reply to Mr. P. Haren, Mr. Satchell said that folder intended for

ensilage should be cut in the green stage, and not allowed to mature.

CRYSTAL BROOK, August 21st .- A code of rules was adopted for the regula-

tion of meetings of the Branch.

ENSILAGE.—In reply to a question by Mr. Billinghurst, Mr. Dennis said that in making ensilage he cut the material on one day and carted it to the silo on the next, and he had been very successful in following this practice.

MOUNT BRYAN EAST, August 28th.—A paper read by Mr. Gare was followed by a long discussion. Mr. F. Thomas tabled a fine sample of Federation wheat grown without manure.

LOWER-NOR'TH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BALAKLAVA (Average annual rainfall, 16.03in.). September 11th.—Present: seven members.

Ensilage.—Mr. Burden read a paper on this subject. Many farms in that district, he said, carried growth that was almost too mixed to produce self-sown hay. It would, however, make good ensilage, and enable the growth to be cut a little earlier than would be the case for hay; thus preventing a number of the weeds seeding and fouling the land for several years. On a dairy farm, where ensilage was almost a necessity, it was usual to have large silos, either under or overground, and into these the material was usually chaffed. For pit silage, an old underground tank would do, although a proper pit would be much better. The crop should be cut a little greener than would be the case for hay, carted in almost at once, and preferably chaffed direct into the pit, care being taken to spread it evenly, and tramp around the sides and in the corners, as air cavities should on no account be left. After filling in three or four feet, a stop should be made until the temperature rose to over 125deg. Fahrenheit, and then 3ft. or 4ft. more should This prevented a further rise in temperature. As each layer be placed on top. reached the temperature of 125deg, more green stuff should be added until the pit The top required to be weighted down to keep out air. Old posts or was full. limestone would answer for this. If it were intended to put down the green stuff without chaffing, it should be treated in the same way, taking care that the material was spread evenly. As it settled very much it was advisable when filling with the crop unchaffed to stack it up a good height above the top of the pit. It would not hurt if it did not settle to the level of the pit. For stack silage, a good bed of straw should be prepared on a well-drained spot, which should be level, to avoid the possibility of the stack settling sideways and overturning. Layers of 4ft. should be put down in a similar manner to chaffed silage until the stack was completed, then it should be weighted down well and securely fenced. To ascertain the temperature of the silage, a good plan was to take a piece of ordinary piping, 4ft. long, place a sharpened plug in one end, and push this down into the stack and drop a piece of wool to the bottom of the pipe. A thermometer could then be let down on a string and left there for 10 minutes or so. Silage should be left for at least six months before being used. The advantages of this means of conserving fodder were that one was able to place a succulent food before the milk cows when there was no green feed available. It not only kept them in better health, but largely increased the milk yield at a time when butter was high in price. It would keep for an indefinite time, and was not liable to destruction by fire or mice, although it should be covered to keep off the rain. A crop made into silage retained a greater feeding value than if made into hay. Where valuable ewes were kept it was a great help if lambing early on scanty feed; a very little silage making the difference between a well-nourished or stunted lamb. Discussion followed, and Messrs. Goldney and Tuck spoke in support of the value of ensilage.

BLYTH (Average annual rainfall, 16.46in.). August 21st.—Present: 15 members.

Annual Meeting.—The retiring Secretary (Mr. J. H. Pratt) presented the annual report on the operations of the Branch during the past 12 months. Twelve meetings had been held, with an average attendance of 13 members. A number of interesting addresses and papers had been contributed at the various meetings and were much appreciated by members. Experimental work had been undertaken, but the drought had caused a complete failure in almost every instance. The election of officers for the forthcoming year took place, and votes of thanks were accorded to the retiring President (Mr. A. L. McEwin), and the Hon. Secretary (Mr. J. H. Pratt).

RIVERTON (Average annual rainfall, 20.48in.). July 21st.—Present: 18 members and five visitors.

Pig Raising.—In a paper on this subject, Mr. J. E. Hannaford said:—"In ordinary circumstances pigs are very profitable. The Berkshire is perhaps the most popular because of its general hardiness. It can stand the hot sun better than most breeds, is thrifty, fattens readily, and the flesh is of good quality, with a fair distribution of fat and lean. It matures early and kills well at any reasonable age. The Berkshire-Essex cross is about the best porker. Poland-China is about the best bacon pig, because it is long-sided and produces The Tamworth is not quite so good, because it eats so nice long thin bacon. much, and it matures more slowly than the others. There is no farm animal that eats more in proportion to its weight, or turns its food into a saleable carcass so rapidly or efficiently, as the pig. Better pork is obtained from an animal that is run in a small paddock, and sty-fed at the last, than one which is sty-fed throughout. Sties should be airy, but not draughty. They should be They should be in a well-drained position if possible, but otherwise the floor should be sloped downwards towards one side of the sty, with a gutter running out through a back corner. The sties should be cleaned out regularly, and bedding should be given the pigs, especially sows, when the weather is cold. For fattening porkers I advocate milk and pollard, or soaked crushed wheat or barley is very good. Copracake is no good for pigs. Bacon pigs need much the same, only in larger quantities. When fattening a bacon pig for killing it is best for the first day to keep on feeding it, and fairly sicken the pig. It will then be found that the animal will not eat so much, and will do just as well. Soaked barley is an all-round pig feed. Green feed is also very good. Our pig-yard is about 3 acres in area. We fenced off 2 acres and planted it with barley. When about 4in high we put a ring in the nose of each sow and ran her on it. Five sows and a litter of seven pigs lived on that for about a month. Then we took them off to give the barley another start, then let them in again. That was the only food the sows were given except the sow with the litter of pigs, which was fed twice daily with pollard. The food of a hog differs somewhat from that of a sow or young pig. When not working he will live entirely on greenstuff, but, as work increases, the ratio of meal should increase. Pigs of all ages should have access to plenty of clean water. When selecting breeding stock it is best to get hold of a young boar, not too big, as the big ones are generally slow and do not last long. Pure-bred boars should be chosen, and it is best not to consider the first prize show pig first. See that his sexual organs are well developed, and that the eye is bright and lively. The selection of the sow is perhaps more important than that of the boar, as it is generally believed that the sow influences the internal organs. Avoid thick, short necked, heavyshouldered sows, as they are generally slow breeders and poor mothers. This type of sow is best for killing for its hams. A boar should be used first when about eight months old, a sow when nine or ten months old. When there are a number of sows to be covered it is best to keep the boar penned up, and put in the sow only for service. The period of a sow's gestation is 16 weeks. The sow's sty should be roomy-about 10ft. square. The best sty is made of 6in. by lin. jarrah, six pieces along each side parallel to the ground, the bottom piece being right on the ground, and each piece above that being 4in. apart. Take about 4ft. roofing iron, cut each piece in halves, and nail it all round the sides of the sty, with the rough edge facing upwards. This encloses the sty for about 2ft. up, and shelters the pig from draught when lying down. The sow

can also see out when standing up, and the sty is kept airy. It should be half covered with a roof. The cheapest and best floor one can have in a sty is made from a mixture of one of cement, three of sand, and five of coal ashes. mixture, wet down to a running substance, and put in the sties, will set down as hard as a cement floor, and it is better, because it is not so smooth. We also They are firstrate in winter, but are very hot in summer have stone sties. time. A sow's sty should have plenty of short bedding in it; if it is long the young pigs are apt to get under her and the old sow lies on them. If the sow is too fat, she becomes lazy and is liable to lie on her pigs. The food for a short time before and after pigging should be soft and sloppy. This can be kept up after parturition as well in preference to meal, as it provides more milk for the litter. The sty should be cleaned out, but the nest should be left When the young pigs are old enough to run about it is best to undisturbed. let them out with their mother, and every time when feeding get them to come into their sty for their food. They are then more easily caught when necessary. The time for weaning is when about eight or nine weeks old. The young boars can be castrated when four or five weeks old or at weaning. The sow comes in season about four or five days after her litter has been weaned, 10 to 14 days after that, and then every two or three weeks regularly. Feed the young pigs at short intervals. They eat more, fatten more quickly, and do not waste so much as if fed at long intervals and given bigger feeds. This year we have fattened five bacon pigs on three bags, or 15bush., of pollard and 8bush. of crushed wheat—cost about £4 10s. in all. Before fattening the pigs weighed about 70lbs. or 80lbs., but when killed they averaged 140lbs."

RIVERTON (Average annual rainfall, 20.48in.).

August 23rd.—Present: nine members.

Ensilage.—Mr. H. A. Davis initiated a discussion on this subject. He said that, with plenty of green growth available, it was an excellent plan to put down a He recommended the use of a cemented pit, as less loss ack method. He favored chaffing the green stuff, which quantity as ensilage. occurred than in the stack method. should be gradually placed in the silo, care being taken to press down the material, more particularly at the sides of the pit. Heavy pressure was required in order to make a success of the venture; planks should be placed on top of the ensilage, and heavy weights should be placed on top of the planks. Artichokes made very good ensilage; silage should never be made from dandelions alone, as they were The Hon. Secretary (Mr. E. A. of a too watery nature to secure good results. Gray) stated that his father had undertaken the manufacture of ensilage with great success. For chaffed material he used a silo, 12ft. long by 7ft. wide, 7ft. below ground, and 7ft. above ground. For long stuff, pits were dug, 15ft. long, 5ft. deep, 7ft. across the bottom, with sloping sides. These were filled and piled up, say 6ft. above ground. A covering of straw was placed over the ensilage, and this was then covered with the earth which had been excavated. Very little waste was experienced with this method. The ensilage remained in very good condition for several years, provided that the silo was airtight.

SALISBURY (Average annual rainfall, 18.57in.).

September 7th.—Present: 13 members.

THE ORANGE.—The following paper on this subject was read by Mr. E. Moss:—"In considering the relative values of the different varieties of oranges it is necessary to have an agreed basis to work upon, and the following should meet the approval of all who grow oranges as a business, and not merely as a hobby. The fruit should be of such a flavor that consumers are always anxious to repeat their orders. It should be attractive in appearance, because prospective buyers are naturally attracted by the best-looking article. The tree should be vigorous and a good bearer, the reasons for which are quite obvious. A few years of experience reveals the fact that many varieties recommended for either one or other of the qualities mentioned are not profitable to grow because they are lacking in one essential qualification, and as I wish to point out in detail the good and bad points of varieties of which I have had some experience, I will not now enlarge upon this phase of the

subject. Perhaps it will be best to clear out of the way the undesirable, or the least desirable, kinds of orange first, and I am able to emphatically say, do not plant the Acme. The reasons for this condemnation I suppose are First, the fruit is sour (or is mostly so), and, second, it falls badly. It is very fine skinned and bright in appearance. My opinion of it is demonstrated by my action in cutting my trees down and budding to more favored kinds. Be careful in planting Mediterranean Sweets. It is a beautiful orange. I regard it, when quite ripe, as equal to the Navel in flavor. But it is a very tricky bearer, and should not be grown except under the most favorable conditions -in deep alluvial soil and well sheltered-and even then adverse conditions at setting time will destroy the seasonable crop, and they will be found bearing at all seasons of the year. The tree has dense foliage, with a drooping tendency, and when bearing a full crop there is no finer sight in an orangery, especially, as with us, the fruit has a good orange color. Its failing is in its unreliability in bearing; its good points are its fine flavor, smooth skin, and splendid hanging quality. However, it will be found decidedly unprofitable in any but the best positions, and even then will have to give place to some other varieties. Ruby Blood I have not grown, but Blood Malta is out of favor with me, mainly for two reasons:-(1) It falls too easily, (2) it does not color evenly, and very often it cannot be distinguished from a non-blood orange. I should not think of planting more, and will probably cut back most of the The Valentia Late with me colors fairly well (though trees which I have. poor coloring seems to be a failing), but the flavor cannot be recommended. Its good points are:—(1) Very late hanging—will hang till end of January and still be juicy; (2) heavy bearing; (3) smooth-skinned and solid. But I should not recommend anyone to plant more than a small proportion even in best soils. Of Navels, I have no compunction in condemning the Australian. The tree is not a good bearer, and the quality in any respect is far below that of the Washington. Thompson's Improved is a good solid Navel, and seems to hang longer than the Washington, but the fruit is neither so large nor so juicy, and my opinion is that its flavor is inferior to the Washington, and I cannot honestly see why they should be planted when the Washington is available, unless it will help to lengthen out the season for Navels. So far as I know the same may be said of several other varieties which are grown, such as Groverly Buckeye, Golden Nugget, and Navelencia. I have had very little practical experience of these kinds, though I have young trees of all these varieties except one; but from what I have seen of them I conclude that in one or more respects they are each below the standard of the Washington. A longer acquaintance may lead me to modify these views. We are apt, however, to become possessed of a sort of rage for growing all the varieties that come under our notice, without reference to their profit-producing qualities. Of course, it is quite legitimate to try recommended varieties on a small scale, in order to prove them; but it is not always safe to plant extensively of a variety which is not well known on the recommendation of a nurseryman. Of Mandarins I have the Dancy, Emperor, Canton, and Nobilius matured, and a few young Beauty of Glen Retreats and Parker's Special. Of the last named, what I have seen and tasted of it has not led me to wish to grow it, except as a And in reference to Glen Retreat, I have come to the conclusion that it is wise to go slow in planting it, for one reason mainly, and that is because it seems to be very short lived. It starts bearing while in the nursery. I have them this year loaded to the ground at two years from the bud. The natural result is that they bear themselves to death at, I should say, from five But this trouble can be lessened very considerably by regular to 10 years. thinning out and pruning back, and the necessity for this relates more or less to all varieties of Mandarins. The bearing propensity of the Glen Retreat should be a recommendation, and will be so if it can be modified sufficiently by pruning to extend the life of the tree to a reasonable length. colors early, but is tart till well on in August, when it is fairly palatable. It is solid, and should be a good packer. Canton is a thoroughly sweet Mandarin, and solid, but its color and general appearance are not attractive, and the tree does not seem to be quite up to the mark as a bearer, and the fruit is generally very uneven in size. The tree with me grows very large and willowy. I am not disposed to planting more of them. As regards the Em-

peror, the one weak point lies in its loose skin, thus rendering it liable to being damaged by pressure in packing. The fruit is large, of good flavor, and attractive, and the tree a good bearer, and fairly strong grower, of bushy habit. It is now in favor, but I should not care to grow them extensively if I were far from the market. The Nobilius, so far as I know, is one of the bestflavored Mandarins grown. It is not too attractive, being pale in color, and it is rather tender skinned; but it is full-fleshed. I have not had sufficient ex-It is not too attractive, being pale in color, and it perience of it to speak dogmatically, but I should think the tree was not too strong a grower, and inclined to be rather more than usually intermittent in However, it is worth a moderate space in the Mandarin patch. Dancy (tangierine), so far as my experience goes, seems to be the most profitable Mandarin to grow, though it is not the nicest to eat, being somewhat sharp. Another characteristic which may be quoted as a failing is a tendency to go dry comparatively early, and it is not generally safe to leave the fruit on the trees after August. It will be observed that of all the citrus tribe the Mandarin seems to be the most difficult to make a choice of variety. Most of them have good points, which seem to be counterbalanced by some failing; but my experience leads me to conclude that the Dancy is the safest to grow (though it does not follow that I would exclude all other varieties), for these reasons—the fruit is very attractive, being almost red, tight skinned, and tough, making it a good carrier, and the tree is a strong, upright grower and a good bearer. These qualities seem to place it at about the top as a profitproducer; and I would place Emperor second, if not far from your market; then Nobilius, with perhaps a higher place than this for Glen Retreat, with more experience of experimental treatment to try and modify its early bearing and early decay. Navels will come next; the Washington seems as near perfection as one can get an orange. Its fine size, bright appearance, and beautifully sweet and tender pulp have made it the favorite amongst consumers, while, added to these recommendations, the vigor of the tree and its bearing qualities have placed it at the top in the estimation of growers. It is a drawback that it does not hang longer, but if we remember the proverb that 'It is not wise to place all our eggs in one basket,' and have another good variety to come in to take its place, though on a somewhat lower level, later, the drawback is not to be considered as very seriously affecting the business as a grower. Now, as to commons, I think I will have to bracket Mexicana and Sabina together, as reaching nearest the standard required in each case, the chief failing consisting of their liability to come off the trees too soon, the Siletta being superior in this regard. The Joppa is a very fine orange, smooth and bright, resembling on a smaller scale the Washington Navel. The tree is a good grower, again not unlike the Washington, and a fine consistent bearer; but the flavor is not A1, the flesh not being sufficiently melting, a failing, to my mind, which relates to the Thompson Improved Navel; and, further, it has a tendency to wilt on the trees as soon as the weather becomes hot. Nevertheless, it is a good orange, and worthy of a 10 per cent. planting amongst commons. The Compuda should have a high place, being of lovely flavor, and the tree a good bearer under very choice conditions; but I found it the least able of all the varieties which I grow to stand adverse seasons, and I do not think the tree is likely to be a very long liver, and no grower relishes the prospect of replanting every 18 years or 20 years. The St. Michael (not paper rind, which I have not grown) for second-grade ground seems to be an ideal tree, growing sufficiently, bearing good fruit regularly, but it is a bit too vigorous, and inclined to be rough in our best soil. For top ground I always recommend it. However, reviewing the list, I should be inclined to put in equal quantities of Mexicana, Sabina, and Siletta, with a smaller space devoted to Joppa on good soil, and if there is a choice sheltered spot available, I would plant Mediterranean Sweet; under any other conditions they will not pay at The reason for not fixing attention entirely to one good variety is obvious. It is because one cannot get one sort to fill all the requirements of quality, bearing, and hanging, the latter being necessary to secure the benefit of the bare market in November. To confine our choice to one, or not more than two, of the varieties which I have fixed on as most profitable—always remembering their case-filling characteristics—this is how I place them:—Mandarin, Dancy; Navel, Washington; Common, Mexicana, Sabina; Late, Valentia." WATERVALE (Average annual rainfall, 27.17in.).
July 26th.—Present: 12 members.

Annual Meeting.—The Hon. Secretary (Mr. J. R. Hamp) reported on the work of the Branch during the preceding year. Eleven meetings were held, with an average attendance of 11 members. The election of officers for the forthcoming year took place.

MANURING FIELD PEAS.—In reply to a question by Mr. W. Smith as to the best manure for field peas, Mr. E. E. Sobels advocated 1 1-3cwts. of superphosphate, and 2-3cwt. of sulphate of potash. Mr. Burgess suggested superphosphate at the rate or

100lbs, to 150lbs, to the acre.

PRUNING FRUIT TREES.—Mr. D. Guthrie initiated a discussion on this question. Various opinions were expressed in regard to the extent of pruning which would be required in view of the dry season just experienced.

RED OIL SPRAY .- In reply to a question by Mr. Guthrie, Mr. Burgess said that

he had obtained good results by the use of this spray.

MALLALA, August 2nd.—An interesting paper dealing with Queensland was contributed by Mr. Hill.

MALLALA, September 7th.—The meeting was held at Mr. Temby's homestead, and the afternoon was spent in an inspection of the crops and buildings. Mr. Marshman exhibited a fine sample of rye, which had reached a height of 5ft. 6in., and in addition a sample of stubble-grown Algerian oats, which measured 3ft. 6in. in height. In the evening Mr. H. Catt read a paper on "Diseases of Wheat," and the discussion on the same was held over until the next meeting.

NANTAWARRA, June 24th.—Mr. E. J. Herbert delivered an address dealing with a visit he had recently made to the Yankalilla district, and he compared the old methods of the cultivation of crops with those he had noted on his recent visit. He mentioned that the land did not yield such good crops as in former times, and some discussion took place as to changes in conditions which would account for this.

NORTHFIELD, August 8th.—An interesting paper describing the agricultural conditions of Western Australia, and the conditions under which land was obtainable from the Government, was read by Mr. J. Warden.

WESTERN DISTRICT.

COORABIE (Average annual rainfall, 11in. to 12in.).
July 31st.—Present: 13 members and three visitors.

Annual Report.—The Hon. Secretary (Mr. H. V. Hobbs) read the annual report of the proceedings of the Branch. The following is taken therefrom:—"During the year 12 meetings were held, with an average attendance of approximately 13 members and three visitors. Discussions on a variety of subjects have been introduced, and well contributed to by the members. Among the more notable of these discussions have been "Horses Eating Wheat," "The Medicine Shelf," "Cooperation," "Types and Varieties of Wheats Growing in the District," "Foxes on Eyre's Peninsula," and "Rabbit Destruction." In addition, one evening's discussion has been devoted to an "Open Parliament." One homestead meeting has been held, and was much appreciated by those members who attended, and I am sure members will agree with me that it will be to the distinct benefit of the Branch and members alike if more of these meetings are held in the coming year. A regular feature of our meetings has been the number of stock ailments reported, and for which advice is sought from the Government Veterinary Lecturer, to whom great thanks are due for his helpful advice and clear explanations. Solely through the efforts of the Branch an important improvement is shortly to be made in the matter of facilities for watering stock-particularly farmers' teams-at Fowler's Bay. A well is to be sunk in the adjacent sandhills, and equipped with automatic windmill and elevated storage tanks; the water is to be conveyed thence threequarters of a mile across the swamp to a trough erected close to the township, alongside the main road; a supply of first-class stock water will henceforth be always available in the most convenient position. Guarantors have been found, the contract has been let, and the contractor is now awaiting the arrival of the necessary.

Completed, as it is hoped to be, in readiness for the next wheat carting season, the scheme will fulfil a long-felt want, and prove a boon to the whole district. The committee of the Bureau, in the interests of the public, originated, designed, and carried through the scheme, and much credit is due to Mr. Kinsley for the valuable assistance he rendered in this matter. Other activities of the Branch that have borne fruit during the last session, have been the appeal for the survey of a township at Coorabie, and the sale of township blocks; the request for a post office at Coorabie, and the inquiry into the unsatisfactory handling of cargo at Fowler's A public committee has been formed to deal with the subject of the handling of goods and the landing charges at Fowler's Bay, and to make more satisfactory arrangements re same. The Branch successfully applied for the establishment of a polling-booth at Coorabie for the convenience of the public. We are continuing to assist, in a small way, with the investigation by departmental experts into the salinity, &c., of stock waters by forwarding samples for analysis every month; and judging by the results of analyses, a very interesting and instructive report should eventually be made available. The great war is not without its report should eventually be made available. The great war is not without its effect on our Bureau. No fewer than nine former members of this Branch are serving their King and country-a fact of which we should be justly proud; and to those nine all honor is due. One of the gallant fellows can never return, and we reverence the memory of Horace Coppins."

COORABIE (Average annual rainfall, 11in. to 12in.).
August 21st.—Present: 13 members and one visitor.

CHARMAN'S OBSERVATIONS.—The Chairman (Mr. V. Sutton Kingsley) delivered an address in which he announced the Committee's plans for ensuring that at least one paper should be contributed at each meeting. He also indicated several paths along which the activities of the Branch could develop.

HONORING LOCAL SOLDIERS.—It was decided to erect a board on which were to be affixed the names of all men who left the district to serve the King, to serve as a roll of honor, in the local hall. The Chairman offered to present the board for the

purpose. This was gratefully accepted.

CLEARING MALLEE SCRUB.—This subject was dealt with in a paper by Mr. F. E. B. Gurney, who preferred cutting to rolling scrub. When laying out the farm, he suggested that the lines should be cut on the square, north, south, east, and west; the paddocks being from 60 to 80 acres in area, with a two-chain break of scrub For rolling scrub, 10 bullocks or six horses, drawing a 7ft. or 8ft. around each. roller, could be used, one man going ahead of the roller, and cutting the largest trees. Whilst this was a quicker method than cutting of getting the scrub down, there was always a certain amount of snagging to be done, and the roller tended to bank the timber in places, which resulted in a bad burn. When axeing, the scrub should be cut as low as possible, the trees being felled in open places to carry the It should be down six or eight months before burning, in order to allow the first erop of shoots to develop. A good firebreak should be thrown in for a distance of half a chain all round the area to be burnt. The fire should be lit in February on a warm day, with a north wind; and, if possible, it should be made to run up hill. In the discussion which followed, and in answer to questions, Mr. Gurney advised lighting all sides of the piece of scrub to be burnt in anticipation. of a change in the direction of the wind. To save the green scrub surrounding the piece to be burnt, he recommended clearing a narrow track a few feet wide inside the green scrub about a couple of chains from the edge, raking back all leaves, bark, and dry timber. He had proved a reserve break like this to be very effective. Mr. Giles considered logging superior to rolling, as with a log many trees were uprooted. The log dealt with bunched scrub better than a roller. He agreed with the writer that it was a mistake to clear large areas of scrub without leaving breaks, but the early settlers had in many cases cut down the belts and bunches of scrub because they harbored flocks of ring-necked parrots, which played havoc with the adjoining wheat crops. This pest was much more in evidence years ago than at the present time. With regard to the wind for burning, his experience favored waiting for a west or south-west wind, which invariably fol-The latter were unreliable, whereas the suclowed a series of hot north winds. cooding west wind was steady and constant. The fire should be started immediately the wind swung round from the north. Mr. Muegge thought 60-acre paddocks were too small. Mr. Stretton would burn with a wind that best suited the situation of the scrub. Members generally favored the axe for clearing scrub such as was found in this district.

> ELBOW HILL (Average annual rainfall, 11in. to 12in.). July 24th.—Present: 12 members and four visitors.

Fallowing.—This subject was dealt with in a paper by Mr. A. R. S. Ramsay. In the discussion which followed, Mr. S. V. Wake said, except after rain, he did not recommend the use of the harrows. Mr. O. Ramsay thought ploughing to a greater depth than 4in. in the hills resulted in elay being brought to the surface. Mr. Dawkins favored early fallow, and harrowing the land after rains, as this consolidated the land underneath, and made a good seed bed. Mr. A. Tilly supported. Mr. Fred T. Freeth thought farmers in this district should do as much as possible of their fallow after harvest and before seeding. Land ploughed in this way gave weeds a chance to grow while seeding was on, then the farmer could go straight to work with his scarifier and be working his land to a great benefit while land was in a proper stage to be worked. He would, if possible, work land in the first place with a scarifier. He favored frequent harrowing after rains. Mr. H. W. Wheeler did not favor ploughing too deeply in flats on account of the prevalence of stumps. Mr. A. Chilman (Chairman) always ploughed land sufficiently deep to cut grass He favored keeping sheep on the fallow to destroy any weeds which came along during the summer months.

KOONIBBA.

August 19th.—Present: 13 members.

SHARE FARMING.—A paper on this subject, written by Mr. R. Schultz, was read by the Hon. Secretary (Mr. E. E. Lutz). The writer considered that the landowner should provide all machinery and horses, and bear the responsibility for breakages or losses, except where they were caused by carelessness on the part of the share farmer. The landowner should also bear half the cost of seed, manure, and Sheds and buildings should be erected at the expense of the land-For tank-making, the owner should provide materials, and the share farmer should supply his labor. For fencing the owner should also provide all materials and half the labor necessary for erection. Half the cost of clearing should be borne by the owner of the farm. In return the share farmer should take every care of stock, implements, &c., and should not neglect such small improvements on the farm as might be necessary. He should remember that, as he received half the proceeds in return for his services, it was to his advantage to crop thoroughly as large an area as possible. Agreements should be made for three or four years at The landowner should not require the immediate return of any horse feed, seed, and manure which he might advance during the early operations on the farm. Considerable discussion took place on the matters referred to in the paper; some members maintained that the landowner should bear the full cost of all scrub clearing in view of the fact that it was his land which was being improved.

> MILTALIE (Average annual rainfall, 14.55in.). August 20th.—Present: 12 members and five visitors.

SELECTION OF SEED FOR THE FARM .- Mr. W. E. Hier dealt with this subject in a paper in which he said that there was no need to go outside the district for a demonstration of the value of results following hand-picking of wheat. well-known J4 wheat originated from a head selected from a crop of Steinwedel. He advised every member of the branch to adopt the practice; with anything like fair seasons the grain from one head would in three or four years be sufficient for sowing a fair-sized piece of land. When single heads were selected in this way it was advisable to discard all but the grains in the centre of each. An alternative was to set aside a few acres of wheat and go through this, carefully picking out the strangers. When the first-mentioned method which was the one he recommended—was adopted, if a particularly good head were noticed before the crop had ripened, it could be marked with a stake. Every care should be exercised to see that the seed was kept clean. Where different varieties of melons and cucumbers were being planted, he said, they should be kept far enough apart to prevent cross-fertilisation; no paddymelons

should be allowed to grow near enough to them to involve a similar danger. Melon seed for planting should be from the best only. Members generally agreed with the opinions expressed in the paper.

MILTALIE (Average annual rainfall, 14.55in.). September 17th.—Present: 10 members and three visitors.

FARM MANAGEMENT.—In a paper on this subject, Mr. P. J. McEachen said that the period between seeding and harvest times should be devoted to such important work as the clearing up of stumps, picking up of stones, rolling of hay crops, and, of course, cultivation of fallow land. Fallowing should be commenced as early as possible in order to destroy weeds before they seeded. He favored the mouldboard share plough, more particularly on heavy soil. This removed more stumps than the If the land were fallowed to a depth of, say, 3½in., it would disk implement. only be necessary to cultivate to a depth of a couple of inches at seed time. believed in rolling the rough ground prior to harrowing. This practice vastly improved the condition of the soil, and the harrows could easily be run over the ground after any subsequent falls of rain. The matter of water conservation was a very important one. The carting of water was very costly, and should be avoided if at all possible; the provision of a cement tank would assist in that direction. number of sheep should be kept on every farm, even if only sufficient to provide meat for the household. A few pigs of a good breed could be kept with profit for Poultry of good laying strains would be found very feeding on suitable refuse. profitable; hatching should be conducted so that the pullets would commence laying in February or March. A blacksmith's outfit was a valuable asset to the farm, as it enabled the farmer to carry out a great number of repairs at a saving of much time and expense. Discussion by members ensued. Varied opinions were expressed in regard to the value of disk ploughs, and the practices of rolling and harrowing. A discussion also took place on the matter of improvement of the quality of poultry stock, and the methods of keeping them.

MOUNT HOPE.

September 10th.—Present: eight members.

Fallowing.—In a paper on this subject Mr. R. Myers said that fallowing was essential to successful farming, more especially on heavy soil. Not only did the practice assist in the conservation of moisture, but it also allowed of the aeration of the soil. He recommended fallowing in August and September for the heavier types of soil. For light, sandy land a good plan was to fallow early, say in July, and sow with barley that could afterwards be fed off, leaving, however, sufficient stubble to prevent drift. In some instances, more especially where land values were high, it would be found profitable to sow large areas of summer fodders on the fallow land. Cultivation of the fallow would be required at intervals, and this assisted towards the establishment of a first-class seed bed for the succeeding crop. Mr. F. Myers spoke in support of the growth of forage crops on fallow land in the coastal districts; where fodder crops were not to be grown, the land was best left in a rough condition until the following seed time. Mr. G. A. Vigar expressed the opinion that the growing of fodder crops on fallow defeated the chief aim of fallowing, namely, the conservation of moisture.

PENONG (Average annual rainfall, 11.93in.). September 11th.—Present: eight members and one visitor.

HAY-MAKING.—Mr. W. Place contributed a paper on this topic. He said that there was almost an unlimited number of wheats which did well in good seasons, but to secure the best average results it was necessary to study the chief characteristics of the many varieties and to select those which proved the best under adverse conditions. Three or four varieties were generally sufficient on one farm, and for a district such as theirs he had no hesitation in recommending Smart's Pioneer Triumph, Firbank, and White Tuscan. Of these varieties Smart's Pioneer, Triumph, and Firbank were early wheats, while White Tuscan was a late variety. If Tuscan were to be sown for hay, it should be put in early, preferably on fallowed ground. White Tuscan was a good stooler, very tall grower, and possessed a good flavor and fine straw of good color. He preferred these four varieties as good hay

For chaff heavier, solid straw varieties were to be prewheats for long feeding. ferred, such as Gluyas and King's Early. He advocated cross drilling seed intended for hay. As a rule the rate of sowing for hay was greater than for grain, and cross drilling ensured a more even distribution of the seed over the ground; heavier applications of superphosphate were advisable for hay-growing. results would be obtained if the wheat were not cut until the grain was well developed; the hay would then have both weight and strength.

The sheaves should loped; the hay would then have both weight and strength. be of medium size, and tied about three-fifths length of sheaf from the head. If the sheaves were made too large there was a risk of straining some parts of the In stooking the sheaves should be stood upright, and not laid on the If the weather were favorable the hay should be carted eight to 12 days g cut. If possible the hay should be stacked under an iron roof; if this after being cut. could be done all loss was avoided. A stack built in the open should be placed on dunnage; if the dunnage were covered with straw there was less likelihood of the stack slipping. A good straw roof (preferably sheaved straw) on the stack would keep out the rain; this straw could be kept in position by wires with weights sus-The stack should always be built lengthwise, east and pended from the ends. west, and hay used first from the eastern end. This method would minimise the Members discussed the paper, and risk of the hay being damaged by the weather. generally agreed with the writer. Smart's Pioneer was considered the best hay wheat for the district. Messrs. J. Oats and J. Stiggants favored building the haystack with its length north and south. Mr. W. Saunders tabled a sample of Cape oats, which measured 4ft. Sin. in height. Mr. J. Oats displayed samples of Firbank, Thew, Triumph, and Smart's Pioneer, all early varieties of wheat. The samples were all over 4ft. in height. A fine turnip measuring 20½ in. in circumference was produced by Mr. A. Shillabier. All samples were grown without the aid of superphosphate, and indicated the average quality of the crops from which they were taken.

ROBERTS AND VERRAN.

August 24th.-Present: five members and one visitor.

BY-PRODUCTS OF THE FARM.-Mr. A. T. Cowley read a lengthy paper, in which he entered a plea for the elimination of waste on the farm. Wheat was regarded as the main source of income of the farm, and dealing with the by-products, he said:--"Straw is usually unsaleable. Horses will readily eat much of the choicest after stripping, and by arranging matters so that all wheat-heaps, etc., are out of the way or well protected as soon as a paddock is reaped, and before rain has come to spoil the feed, we can save hay, which is a marketable product. When gathered early and clean straw can be fed in the stable—especially where a farmer has a chaffcutter, and can mix straw chaff and hay chaff-and he still has a feed of good quality, provided the hay contains a good percentage of fairly well-developed grain. A straw stack, well built to resist rain, put by in a year of plenty, may become a lifesaver to stock in a drought. Straw thatch on a stable or shed roof may save the expense of a costly material, but a straw roof, unless really well made, may be a very unprofitable proposition. If it leaks and allows horse feed, grain, or farm machinery to become damaged with water, or if it provides a harbor and nesting-place for birds, such as sparrows or starlings, it may cost the farmer many times more than an iron roof in a few years. Straw also has its use in the field. Unless required for any of the before-mentioned purposes, I should advise that, after lightly feeding off so as not to waste the best feed-material of it, that it be burnt upon the land. This applies to this particular district, of course; other parts of the country may have their peculiar needs. A stubble fire is the cheapest and quickest mallee-stump and shrub killer. Further, I believe our land needs the action of fire upon it to render it profitably productive. We all know that a great deal depends upon a good scrub fire in the first place. The first crop will show where the fire burned well and where otherwise. I believe a good stubble fire also acts in this way. Stubble burned is therefore not necessarily wasted, and I believe it may often be more profitably burned upon the land than gathered from it. Wheat-chaff has a feed value. Horses, cattle, sheep, and even pigs will eat it. Its use, in conjunction with oats, bran and pollard, or green feed, as a hay-saver is so well known as to call for little comment here. It is frequently saleable, thus bringing in a direct profit, but on the whole

is more profitable when used as a substitute for more costly fodder. It can often be given to idle horses when they need a little dry feed, and in such cases may answer the purpose quite satisfactory. There are a number of minor uses to which it may be put, but which I may pass over to save time. One, however, is that in consequence of its fire-retaining character it is an excellent A stump, too large to plough out, often reaid to mallee-stump destruction. mains in a field until quite a number of broken bolts and castings from various farm implements may be found scattered around it. A bag or two of wheat-chaff heaped upon such a stump and lighted will keep it alight until it is consumed, and save the destruction of machinery; being easier than grubbing, and cheaper as well, it pays to treat the stump this way. 'Screenings' are generally converted into eggs and bacon. I consider eggs the more profitable, or at least the more desirable, and should leave pigs out of consideration altogether when dealing with screenings, but for the fact that they will sometimes consume stuff which fowls would simply waste, and a variety of waste from the kitchen, dairy, and garden find a place in the trough. At times, however, the supply from these sources is reduced to 'dishwater soup' and 'potato peelings,' and the pigs then need a bag or two of screenings to help So much for the by-products of the wheat field. A few others them through. may be but briefly mentioned. Every farmer keeps horses, and apart from fulfilling the purpose for which he keeps them, they produce hair and manure. I believe in trimming horses' tails, not docking them to reduce hair production. Horsehair is valuable, and when trimmed regularly and properly the tail and mane are profit-producing parts of the horse. The hair should be kept clean free from straw, which, if allowed to become mixed with it, reduces its cash value considerably. The refuse of the stable, together with that of the cow yard, pigsty, and poultry yard, may be turned to profitable account in the garden or in small fields, and are not only cheaper, but better, than commercial fertilisers for producing certain classes of vegetation. 'Super-bags' and onceused binder twine have to be dealt with, and large quantities may be seen going to waste on many farms where they might be put to use. Super-bags, if obtained in good condition (as they sometimes are, especially those which are emptied early in the season) may be washed clean, either by immersion or by hanging them on a fence in showery weather, and may be preserved for a useful career as holders of screenings, chaff, etc., and even seed wheat, and many other purposes for which an acid-rotted sack is useless and a new cornsack expensive. Binder twine has a variety of uses. I have seen and used very serviceable rope made of sheafbands. Serviceable doormats may also be made from it. The manufacture of these articles may not save enough expenditure to pay for the farmer's time if his farm work stood still while he made them, but the farmer's children often enjoy the work of making such things, and the farmer himself may join them in it on a rainy day, teaching them at the same time to be thrifty and industrious. Almost every farmer in a newly developed district has occasion to put up temporary fencing. Binder twine is a good weather-resister, and will hold a barbed wire or netting on to posts or iron standards quite securely for two years or more. This use of it will save the use of wire, which would have to be cut up for the purpose into short scraps. The binder twine ties also save time in removing the temporary fence, as they can simply be cut where a wire tie would have to be untwisted or cut to waste. The trimmings of galvanized-iron used on the farmhouse or other buildings also claim attention. These strips, cut again into short lengths, make excellent ties for fixing netting to plain or barb wire in either permanent or temporary fences." Mr. W. Kunst endorsed the views expressed by the writer of the paper. Mr. F. Masters emphasised the value of a few pounds of chaff fed to ewes during the breeding season. When wheat was cheap it might be more profitably disposed of by feeding it to fowls than by being marketed as grain. Mr. R. P. Hoar also spoke.

SALT CREEK.

August 21st.—Present: 15 members and two visitors.

FARMYARD MANURE.—Mr. W. Lee, sen., read a short paper. He advised keeping cattle yarded during the winter, in paddocks spread with straw. The cows should

be fed on cocky chaff and bran, if it were cheap enough; one bushel per week for each animal. After seeding the manure should be gathered and placed in long narrow heaps, covered with 6in. of earth, and allowed to remain for a year or two. It should then be distributed on fallow at the rate of twenty cartloads per acre, and ploughed under as deeply as possible. Peas, mangolds, or sorghum should be planted, after which three or four successive crops of wheat could be grown without further manure. Messrs. Gale and Abrook did not feel satisfied that this practice could be followed in this district. Mr. Hill said small paddocks dressed with farmyard manure, and sown for feed would be found to pay. Mr. Stephens had carted manure straight from the yard on to the land, after which good feed was secured. The Chairman (Mr. G. Barber) had applied farmyard manure to sandy land with satisfactory results, but on flats so treated the crop blighted off. Mr. Lee, in reply, mentioned that he had secured excellent results from farmyard manure used in the garden.

YABMANA (Average annual rainfall, 15.14in.). August 21st.—Present: 12 members and three visitors.

Horse Feed in Dry Seasons.—In a paper with this title, Mr. F. A. Beinke said that in the absence of hay chaff, the best substitute was cocky chaff; the latter, however, was not a good feed in itself, but required the addition of grain to increase its food value. In the recent drought period he had used for a feed for 11 horses, one bran bag of cocky chaff with 3galls. to 4galls. of whole wheat. Feed-He did ing on this basis, he had been able to keep his horses in good condition. not favor damping the food if the horses would eat it dry. He strongly advocated the feeding of dry grain, wheat, oats, and barley, and these would be con-In discussing the paper, Mr. L. G. Strother said siderably improved by crushing. the wheat should either be crushed or boiled before feeding. Mr. J. F. Robertson favored the feeding of crushed grain and molasses with cocky chaff. If grain such as barley or oats were fed whole, trouble would probably be caused by their springing up in cultivated fields where their presence was not desired. Mr. G. Dorey said that care was necessary in regard to the proportion of grain fed to horses; he preferred bran and pollard. Mr. J. H. Frost also supported the use of bran and pollard, but he mentioned that in recent times the feeding of grain was cheaper. Mr. W. M. Robertson said that the wisest plan was to reserve a good stock of hav, which would meet all requirements. Mr. W. Dorey deprecated the feeding of molasses to working horses, and recommended crushed corn. man (Mr. C. W. Storey), supported the practice of keeping a reserve of hay. Straw would prove of considerable assistance in times of shortage.

YADNARIE (Average annual rainfall, 14.09in.). August 25th.—Present: 13 members and four visitors.

FORGE ON THE FARM .-- A paper with this title was contributed by a member. He mentioned the many small blacksmithing jobs which could easily be undertaken by a farmer with a little experience. The welding of two pieces of iron together was quite a simple process. The fire should be kept clear of ashes and clinker, and one edge of each piece of iron should be thinned down. The ends should then be brought to a white heat, taken quickly out of the fire, placed together, and hammered smartly, not too heavily at first, but gradually increasing the weight of the hammering as the iron cooled off. The iron, however, should never be worked when black hot, as it was then likely to crack. A forge was essential to the satisfactory shoeing of horses. The superfluous horn on the horse's hoof should first be removed with a toe knife, and the surface should then be smoothed with a rasp. If the hoof were mis-shapen, the fault should be corrected as far as possible by the use of the rasp. The shoe should then be shaped to fit the hoof as nearly as possible, and by using the hot shoe and a farrier's knife a good job could The forge necessitated some outlay of money, but there was no doubt it was well warranted. The paper was discussed by members, whose opinion differed in regard to the respective merits of the bellows and blowers for the forge.

CARROW, August 26th.—Fodder Conservation.—An extract from the Journal was read by Messrs. D. Burt and T. Beare, and was commented upon by members,

who were agreed upon the importance of making proper provision to meet any shortage of fodder which was likely to occur. Mr. Beare tabled a sheaf of barley, 4ft. in height, and a discussion took place in regard to the production of early feed. Members thought that the provision of even a small quantity of green feed for stock during the dry weather was of more value than a medicine chest.

COLTON, August 21st.—References in the *Journal* to co-operation were discussed by members, who held the opinion that local co-operation might be advantageous in certain instances, but that the formation of a large co-operative body was unwarranted.

ELBOW HILL, August 21st.—Members discussed the keeping of poultry. Messrs. G. F. Wake and O. A. Dawkins advised those who keep good breeds of fowls to house and treat them properly.

GREEN PATCH, September 20th.—The matter of establishing a butter factory at Port Lincoln was introduced and discussed by members.

KOONIBBA, July 22nd.—Mr. A. R. Schultz read a paper on "Share Farming," which was held over for discussion at the next meeting.

PENONG, August 14th.—Mr. J. Oats addressed the meeting on the subject of Bureau work. He referred to the many advantages appertaining to the Agricultural Bureau, and exhorted members to maintain interest in the organisation.

YADNARIE, July 23rd.—Conduct of Meetings.—A number of by-laws were framed with the object of securing the better management of Bureau meetings. In reply to a question by Mr. W. J. Johnson regarding the treatment of super. bags to make them fit to hold seed, various suggestions were made by members, such as washing in bluestone water, or dusting and hanging out in the rain.

YEELANNA, September 18th.—A paper on lucerne-growing was read from the Journal and discussed by members. A number of fine specimens of lucerne and mustard were tabled by the Hon. Secretary (Mr. S. A. Wilkin).

EASTERN DISTRICT. .EAST OF MOUNT LOFTY RANGES.)

BORRIKA.

August 21st.—Present: 20 members and 25 visitors.

CO-OPERATION IN WHEAT CLEANING.—In a paper on this subject, Mr. H. J. Richards suggested that in view of the probable shortage of skilled farm labor, good results should follow the co-operative purchase of a power winnower. By way of illustration, he instanced three farmers, say, A, who had 2,000 bags to clean; B, 1,800; and C, 1,200. They should fix on a price for cleaning, say 4d. per bag, which would mean the cost to each would be: A, £33 6s. Sd.; B, £30; and C, £20, these amounts being paid into a joint account. Ten per cent. should be deducted from this to cover depreciation, etc., and the balance equally divided amongst the participants in the scheme. Members discussed this subject, and, in addition, the co-operative purchase of farm implements, etc., the general opinion being that the latter scheme was not practicable.

Messrs. E. H. Huxtable and Hart mentioned that stock preferred graving on

crops that had been dressed with super. rather than on those not so treated.

Mr. Neville drew attention to the appearance of sorrel in the district. He advised the application of lime at the rate of not less than ½ ton to the acre as a means of discouraging its growth. Mr. Mann agreed, and advised working the land in dry weather.

BRINKLEY.

September 18th.—Present: seven members and two visitors.

BREEDING OF DRAUGHT STOCK.—In a paper on this subject, Mr. C. H. Forrest emphasized the importance of selecting breeding mares of first quality, and constitutionally sound. These should be mated with the best class of stallions only, sound, active, and with a good pedigree. It was better to pay more for the service of a good animal than to breed from inferior stock. The aim of the breeder should

be to always improve the standard of his stock. Mr. W. Pearson said that a good medium draught horse was more suitable for farm work than the heavier types. The Hon. Secretary (Mr. H. D. Humphrey) favored the Clydesdale horse. The difficulty in breeding medium draughts was to secure horses of uniform type; and there was always a ready market for heavy draught horses. Mr. H. Pearson also supported the employment of heavy draught horses for farm work. He found that they did better work than the lighter types, and were more easily maintained in condition.

CLANFIELD (Average annual rainfall, 16in. to 17in.). August 28th.—Present: six members and two visitors.

SHARE FARMING.—In a paper on this subject, Mr. F. G. Moar described the conditions under which farming was conducted on shares in New South Wales, Victoria, and different parts of this State. The usual agreement for this district, he said, was for the proprietor to find seed and super. and pay for the carting of his share of the crop to the nearest railway station. The share-farmer found the necessary stock and implements. He considered that for every 100 acres sown the share farmer should be allowed five acres for horse feed. Generally members agreed with the opinions expressed by the writer of the paper. Mr. Wilkin (Chairman) thought the share-farmer should be allowed seven acres of each 100 acres sown for providing horse feed.

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.). August 23rd.—Present: 11 members and two visitors.

VETERINARY CLUBS.—Mr. C. Dunstone contributed a paper on the question of establishing veterinary clubs throughout the State with the view of making available to farmers better veterinary advice than they could secure under present conditions. The advice received by post was often unreliable owing to the difficulty which the average farmer experienced in accurately describing the symptoms of ailing stock, and the consequent liability of the veterinary to wrongly diagnose the cases. The only solution of the difficulty was the establishment of something in the nature of a veterinary club, members of which would contribute subscriptions in advance, and in return received, on the payment of a small fee, the advice of the veterinary employed by the club. The services of the veterinary should be confined to members of the club only. Details of the scheme would have to be decided, but one important matter was the appointment of the veterinary adviser under such conditions as would ensure that he could not transfer the practice to an unqualified practitioner. The paper was well discussed by members, who feared that the formation of a club could not be undertaken in such a new district.

COOMANDOOK (Average annual rainfall, 18.01in.). July 24th.—Present: 14 members.

Handling Mallee Stumps.—Mr. R. A. Williams, in a short paper, expressed the opinion that it was wise for the farmer in mallee land to plough out stumps; otherwise he was unable to work his land properly. Wear and tear of machinery was a considerable item when the stumps were allowed to remain in the land. The work entailed in slashing shoots was also a factor. Mr. R. Upton also read a short paper, in which he said:—''I do not contend that under all circumstances it will be advisable to leave the roots in the ground, but if grazing is intended, no good purpose can be served by ploughing out dead roots. Take, for instance, the case of a man with 1,500 acres of mallee. He is fortunate if he can plough out or kill the growth on 200 acres each year. When the first paddock of this size has been dealt with it can be devoted to grazing of either sheep or cattle, and the next paddock taken in hand. Proceeding in this manner our farmer will leave grass land behind him, and in about eight years will have little cause to trouble about mallee. It will be found by then that the best grass patches in the early cleared land are those round dead mallee roots. Time, white ants, and other agencies will have transformed portion of these roots into humus, which is so deficient in most of our soils. Almost the only source of humus is decaying vegetable or animal matter, and a ton or two of roots per acre would be of considerable value. The amount of

humus in a soil can be approximately estimated by its color. The darker the soil the more humus, but the lighter soils of arid or semi-arid lands should not be judged by their color alone, as the humus they contain is usually richer in nitrogen. On returning to paddock No. 1 after the eight years, our farmer could easily plough out his roots, unless he desired a further supply of humus, and under these conditions less draught would be required on his plough."

FORSTER (Average annual rainfall, 10in. to 11in.). July 24th.—Present: four members and one visitor.

Mr. W. Johns contributed a paper in which he expounded a method of arranging swings, which would mean an appreciable saving of labor for horses.

HALIDON.

August 25th.—Present: 12 members and six visitors. Harvesting Machinery.—This subject was dealt with in the following paper by Mr. C. H. Russell:-" As a general rule, from an £ s. d. point of view, the man with 300 acres of crop or less, would do well to purchase a harvester. For the forthcoming harvest, and probably the following harvest, this machine will be especially attractive wing to the likely shortage of labor. To work this successfully the operator must have had experience, and lack of this is one of the principal reasons that the harvester is not a success for large areas of crop. In very hilly country it is at a disadvantage owing to the wheat falling on one side of the screens and the difficulty of maintaining an even pace, for a sudden acceleration of speed will cause grain to be blown over the back. It has been urged against the use of the harvester that it loses the cocky chaff and is a disseminator of weed seeds, but this can be overcome by the use of a suitable chaff carrier. In setting for work, care should be taken first that the beaters are adjusted correctly, i.e., just far enough from the comb that it will strip the heads clean, but not so close to the concave that the grain is cracked—with some wheats in very hot weather it will be of advantage to take the concave out altogether, for it is chiefly in the drum that the wheat is cracked; secondly that the screens are properly adjusted, for, unless care is used here, either wheat is lost over the back or a dirty sample is pro-Allow just enough fall to run the whiteheads off, and see that the screens are level. Some varieties of wheat such as King's Early, require coarser sieves than others, such as Federation. With regard to the stripper, its advantages are its lightness of draught and simplicity in handling. Its principal disadvantages are that it cannot be operated until the straw is brittle and dry, thus losing much valuable time in the mornings, and the labor it involves in cleaning the wheat afterwards. The latter is a serious one in times like the present. Apropos, a simple and effective method of emptying a stripper is by means of a two-handled scraper. This can be made by boring two holes of about an inch in diameter in a piece of 6in. x 1in. hardwood, a little shorter than the width of the stripper. Each hole should be bored about a foot from the end, and a couple of inches from the bottom of the scraper. Mallee sticks inserted and wedged, should be a little shorter than the length of the box. The scraper is placed in the box when empty—when full a man on each handle can remove nearly the whole of the contents with one pull. Of course, this is only suitable when the winnowing is done at the same time as stripping. A few points that apply to both machines:-If a piece of galvanized iron is suspended from the axle and weighted, much straw will be knocked down, and will help in a stubble burn considerably. Some implements are fitted with adjustable combs—these should be set as close as possible, but wide enough to allow the nodes to pass through the fingers. If the fingers are at all worn they should be sent to the blacksmith to be closed. A spare finger or two sometimes proves useful at harvest time. With regard to lubrication, see that the syphons are drawing freely, and above all use a good lubricating oil—a penny saved here costs pounds in repairs. Better work is done during the middle of the day, so that every effort should be made to keep the machinery working At this time it is sometimes advisable to place a larger pulley on the beaters, as some wheats are apt to crack badly when the weather is hot. Ιt should be borne in mind that the larger the beater pulley the lighter the draught. When commencing, pull the belt backwards so that the clutches will mesh. Do not use sticky substances such as treacle or resin on the belts-these only afford temporary relief and ruin a belt. Have the belt well oiled some time before reaping,

use leather-covered pulleys, and no trouble will be experienced with slipping belts. Finally, see that a supply of good oil is on hand before harvest, black lead for cogs A good discussion followed, and Mr. and chains, and a spare finger or two.'' For this sandy country he recommended a Russell answered various questions. harvester of 5ft, comb to be drawn by five horses. Wider combed machines required more horses, and it then became necessary to work half as leaders. one was fortunate in having exceptionally good leaders, it soon became a difficult matter to keep up the pace. For a similar reason, and also owing to the side draught, he recommended a stripper of not more than 7ft. comb. A visitor mentioned that setting the beaters too close to the concave not only cracked the grain but made the machine pull half a horse heavier. Mr. Bird thought one secured a better stubble burn after the use of the harvester.

LAMEROO (Average annual rainfall, 16.55in.). August 21st.—Present: 17 members.

Poultry on the Farm.—This subject was dealt with in a paper by Mr. A. J. A. Koch, who had for the past three years made a practice of keeping poultry in a confined area, and had kept a careful record of outgoings and returns. 14 weeks ended July 31st, this year, he had marketed an average of 12½doz. eggs, valued at 1s. 5d. per dozen net. For the past two seasons he had confined his attention solely to White Leghorns; White Orpingtons tried three years ago, were Whilst it was admitted that the practice of keeping the hens in not satisfactory. confinement involved extra trouble, he said, the advantages far outweighed this. Better eggs, better prices, and greater satisfaction to both buyers and seller were t. Mr. Koch had a 120-egg incubator, with which he hatched all his He had previously used a 60-egg machine, but found that the latter meant at least five hatches for the season, with a difference of about 15 weeks in the ages of the chicks. "With a big machine," the paper continued, "two, or at the most, three hatches, should be enough, and the difference in their ages three to six They would all grow up together, the cockerels could be sold off at the one time, and the pullets would all be ready to commence laying together between February and March 1st, that is by getting out the first hatch by the second or third From the incubator I transfer the chicks to a brooder, week in August. and keep them in that for about a fortnight, at the end of which time they are old enough to do without artificial heat, and then I put them for the night into a barrel cut in halves, and inverted on to a wooden bottom, and possessing a small slide door made of tin. The barrel should have a few holes around the top for ventilation, and the door should be left open about an inch. After the second night the chicks will go in and out of the brooder themselves, and are very little bother from When they are about six weeks old I shut them out of the barrels and make them roost in the open with a sheet of iron to break the west wind, and one on top to protect them from rain. For the first fortnight I feed them on a chick meal, and after that on a mixture consisting of roughly crushed wheat (sifting out the flour, and using the coarse) and a little canary seed, hemp, linseed, crushed bone, and crushed peas. My plan is to keep plenty of feed and water in the run for them, they will not then over eat themselves, because it is always there when wanted. It is a good plan to boil a rabbit and give them the head and other bones. They will leave all other food for this, and it makes them grow apace. From 10 to 12 weeks old they can eat whole grain; give them plenty, and keep them growing on good, hard, nutritious food, and they will lay at five months old. They are now ready to go into the laying pens, and should begin to make themselves useful. The early pullets may go into a slight moult as late as June, but usually keep on laying, although not quite so freely as when out of it. I have seven yards, five of them 8ft. x 40ft., including a shed 4ft. deep. These yards will accommodate from 10 to 15 pullets or hens each, the other two yards are 10ft. x 40ft., with a shed 10ft. x 10ft., and will accommodate 20 pullets each. As previously stated, I keep a daily tally of all eggs laid by each pen. This is where the surprises come in, and when one has the results down in black and white, there is no disputing the fact. For example, from the 1st of April, 1913, to 30th March, 1914, I had in the yards, 32 White Leghorns, 45 White Orpingtons, and 18 white common hens, and for the year got a little over 670doz. eggs. I sold all the common hens, also all the White Orpingtons, and the next year, for the same period, with the same number of hens-all White Leghorns-I obtained 1,030doz., being 360doz. over the previous year's total. They ate no more feed, and received no more attention than

the others. I now have 93 hens and three cockerels, and they consume the following quantity of food daily. In the morning, with 14lbs. of bran, I mix 4lb. of meat meal and pour boiling water over it, then add 5lbs. of crushed wheat, mix these, and add the same quantity in bulk of chaffed green stuff, either rye, barley, oats, wheat, or lucerne, whichever is most forward. A single handful is given to each bird. At night I feed a single handful to each hen of wheat, which takes 11lbs. per day, costing for feeding, at present prices, about £3 5s. per month. This may sound high, and it is, but the greater portion of this feed is grown on the farm. In reality, it only cost Ss. 6d. per month for stuff purchased. These figures are for this season, which is not an ordinary one for comparison, for while all fodders used in this line have advanced quite 100 per cent., eggs have only advanced about 33 per cent. In this paper I have not taken into account chicks hatched, settings sold, and cockerels marketed, which would all go to swell the credit side of the ledger. Then again, eggs could be pickled for family use from March to July 30th, when they are cheap, and the fresh eggs sold in the late autumn, when there is a scarcity and values are high. Eggs for pickling should be infertile, as they then keep better. I found it imperative to have a patch of lucerne for summer green feed. During last summer, from September to March of this year, this not only provided the fowls with green chaff, but six cows were able to get an armful once a day, thus proving itself a most valuable asset. Poultry, if properly housed, cleanly kept, and systematically handled, are a paying proposition on any farm, especially so in this district, where we can grow our own green fodders all through the summer, and most of the other feed consumed is the produce of the farm. Get good stock, and whether they are kept running at large or in close confinement, they certainly will make good." The paper was well discussed by members.

MINDARIE.

August 9th.—Present 15 members.

Annual Meeting.—The Hon. Secretary (Mr. E. L. Parker) presented the annual report of the Branch, which showed that 11 meetings had been held during the previous year, with an average attendance of 25 per cent. of the membership. A number of instructive papers had been contributed by members at the various meetings.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.). August 21st.—Present: 23 members and six visitors.

HANDLING YOUNG HORSES.—In a short paper on this subject, Mr. E. Tillbrook said foals should be handled and taught to lead and tie up when five weeks old. At 2½ years the animal should be eaught with the aid of a stick and rope, tied up, An open bridle should be put on by first rubbing it gently over and handled well. its nose and cars. His head should be brought gently around to the near side by means of a short piece of rope attached to a surcingle. After allowing the colt to go around the yard for a quarter of an hour, the rope should be shortened back on the offside, and after a lapse of a similar period, back to the near side. collar and hames should be put on, and by means of a long rope attached to the bit, After further handling it could be atthe heast should be taught to lead. tached to a light log, and taught to pull, subsequently being put into a spring van or trolly with a reliable horse, and worked for a hour or two. Mr. A. Braendler thought there was a danger of a young horse put on to a log by itself becoming tangled in the gear, and thus be induced to kick. Mr. J. Frahn would put the young horse in a van, together with an old, reliable animal, work it there until fairly quiet, and then put it in a big team on the plough. Members generally agreed with this method.

MURRAY BRIDGE.

July 26th.—Present: 20 members and 18 visitors.

The Director of Irrigation (Mr. S. McIntosh) delivered an address in which he dealt with the question of fodder growing on the reclaimed swamp lands. He also spoke at length on the importance of grading the land, the necessity for care in the provision of draining and irrigating ditches, the cultivation of the soil, and various crops which could profitably be grown.

MURRAY BRIDGE.

August 23rd.—Present: 21 members and nine visitors. DAIRYING .- An address on this subject was delivered by the Government Dairy Assistant (Mr. H. J. Apps). The most important matter in dairying, he said, was the thorough and continued testing of the dairy herd, in order to eliminate all those animals which did not supply sufficient milk, or milk of a satisfactory quality. Cleanliness was of the utmost importance in handling milk, therefore the greatest care should be exercised in the cleansing of utensils. They should first be rinsed in cold water, as the use of hot water caused the formation of a film on the surface of the vessels which was difficult to remove. After rinsing with cold water, the vessels should be cleansed with hot water and soda; following this they should be rinsed with lime water or, better still, treated with steam. Cloths should never be used in cleaning operations; a brush was much to be preferred, as it could be A separate bucket should be kept for washing udders and thoroughly cleaned. The first few streams of milk should always be discarded. flanks. milk should be thoroughly strained and covered with gauze. When proper care was exercised milk preservatives were unnecessary, and their use was in most cases forbidden by law. Delivery of cream to factories should be frequent and regular, and it should not be allowed to become overheated. Unless these matters were observed it was impossible for factories to produce butter of the first quality. In forwarding cans of cream, the lids should not be fastened with rags, as these rapidly became foul; butter parchment should be used. It was most important to keep separators in thorough working order to obtain the best results. should be tested regularly, and in this connection, representative samples should be submitted, that is, samples taken from time to time as the separating proceeded. Ninety-eight degrees Fahrenheit was the correct temperature at which to separate In cleaning the separator, the bowl should be flushed out with the skim In view of present conditions the raising of dairy cattle should prove a profitable undertaking for dairymen. In this connection the feeding of calves should be carefully studied. To raise a calf, about 22galls. of fresh, and 160galls. to 180galls, of skim milk were required. The first milk yielded by a cow after calving, known as "beestings," was very necessary for the calf, as it contained about 15 per cent. of albumen, whereas normal milk contained only 4 per cent. The feeding of this "beestings" acted as a preventive against scouring. The following was a substitute for colostrum for feeding calves:-One pint of water, 1 pint ing was a substitute for colostrum for feeding caives:—One pint of water, I pint of milk, I egg beaten up, and half a teaspoonful of castor oil. The calf should be fed three times daily, with the feed at a temperature of 98deg. Fahr; it was important to always have the food at the same temperature. The proportion of fresh milk should be gradually reduced, and skim milk substituted; care being taken not to make the change too suddenly. To meet the deficiency of fat in skim milk, ½ pint to 1 pint of ground linseed, boiled to a jelly, should be added. Two gallons of skim milk, with the addition of linseed was sufficient for the calf; overfeeding should be avoided. Too early weaning was a great mistake, as it caused a check in the growth of the calf, which would have a serious effect on its future milk producing capacity. milk were not available, a good substitute could be prepared by making ground oats, linseed meal and flour into a smooth paste, and then adding 15lbs. of water. To prevent scouring, limewater should be administered twice weekly. stated that the Department was willing to undertake the testing of milk under conditions which he explained. At the conclusion of the address he replied to a number of questions put to him by the audience. Mr. Legg emphasized the need for care in marketing of cream, and said that if dairymen heeded the advice given there would be fewer complaints about the results from the factories.

PINNAROO (Average annual rainfall, 16.74in.).

August 20th.—Present: 23 members and four visitors.

MIXED FARMING.—Mr. A. H. Symonds read a paper on this subject. that in older settled districts it had been found advantageous to combine various other branches of the farming industry with that of wheatgrowing. In newer settled areas such as theirs, recent experience had taught them that to depend on wheat-growing alone was risky, if, indeed, not disastrous. The first variation, in a mallee district, that could be most easily made was the growing of crops other than This was not only beneficial to the land, but was also very necessary to the success of stock raising. Twenty years' experience in a district where the

land had become worn out for wheatgrowing had shown that a change to the growing of oats gave highly profitable returns, as well as putting the land in excellent heart for the further production of wheat. Oats had the further advantage of not being a host for the takeall fungus. Further, it was quite possible to grow a good crop of oats on the poorer classes of soil not suitable for wheat. also greatly enriched the soil, and any farmer having a few acres free of stumps would do well to experiment with them, sowing about the end of May. risk with such a crop was the possibility of a severe frost or hot wind during flowerrisk while a crop was the possibility of a severe risk of not wind utiling nowering. Either sheep or pigs would fatten to prime condition and gather almost every pea if turned on the crop when ripe. Fodder crops, such as lucerne, mangolds, and piemelons should also be grown. Quite a small plot of lucerne, if well manured and irrigated, would yield an invaluable supply of green fodder throughout the summer months, being especially valuable in supplying change of diet so necessary to the health of all stock. Mangolds were prolific, and were much relished by cattle, pigs, and poultry. Piemelons were easily grown; a few acres of fallow on the northern slope of a good sand ridge sown in September would give a good supply of fodder for cattle and store pigs. It was best to slice the melons when feeding to cattle. The keeping of poultry could be commenced quite early in the making of the farm. The advantages were small initial cost for stock and accom-The necessary food was easily provided, and only a short time each modation. day was needed for their care. A warm, clean house, with a fox-proof yard, should For egg-production White Leghorns of a good laying strain were ended. For the average mixed farm from 60 to 100 head was be provided. For e to be recommended. usually the most profitable number to keep. As soon as a settler had at least a portion of his holding fenced, he would require a milking cow or two for the use of his household. It was but little more trouble to care for half a dozen cows than one or two, and the surplus produce, where there was a convenient market, would be found to provide a regular source of income. The required number of shapely cows or heifers should be secured from some good dairy herd, and a pedigreed bull of a proved milking strain should be used. He favored the Jersey cows, but whichever breed was chosen it was wisest to persevere with that breed alone. should calve about the end of April, so that they were in full milking whilst green feed was plentiful. No other feeding was so cheap. It was also of great assistance in the raising of the calves. All feed should be grown on the farm, as even the purchase of bran, which was, perhaps, the best addition to dry feed, was unprofitable. A sandy slope should be selected as a site for the milking shed and yard. The shed should open on the east. For feeding each cow should be bailed securely, having a shallow raised crib running the length of the shed. The crib should be about 2ft. from the ground, 1ft. wide in the bottom, 6in. deep on one side, with a 2ft. "spitting" board on the other, which prevented all waste. shed should be paved with the best material available, giving the floor a good slope If the various crops mentioned were grown there should always be for drainage. ample and suitable fodder available. There was no better fodder than a stack of hay, but it was not always profitable, so other cheaper home-grown fodders should be substituted. Pig-raising could be advantageously combined with dairying, and if systematically carried out, was profitable, as through this medium a good deal of what would otherwise be waste was converted into a marketable commodity. This was especially the case with the keeping of breeding sows, as, excepting the period of suckling their litters, they would thrive on various odds and ends that, for fattening purposes, would be useless. A run should be provided for them and sown in the early autumn with Cape barley. Farrowing should take place in May The May litter could then be raised by feeding from the green and November. barley and the skim milk from the dairy. The November litter could be easily maintained with harvest offal. As in all other stock, good animals were essential. About four or five sows of good type mated with a pure-bred boar, were enough for the average mixed farm. For general purposes there was no better breed than the Berkshire. Of all branches of livestock farming the keeping of sheep was probably the most congenial and lucrative under suitable conditions. So far as mallee districts were concerned, it was likely to be the last branch of livestock farming to engage attention of farmers, necessitating as it did, considerable outlay in the way of fencing and purchase of stock. In spite of all difficulties it had been proved to be a successful and profitable undertaking, not only giving its quota of direct returns in the way of wool, lambs, and mutton, but in indirectly ridding the farm of weeds; while sheep running on fallow ground had also been found highly

beneficial. As to breed, there was no better sheep for general utility than the first cross from the Lincoln ram and Merino ewes; these crossbred ewes being the ideal sheep to mate with black-faced rams for the production of export lambs. Sheep should not be allowed to traffic on a bare sandy surface, as they would certainly cause drift. Where drifts already existed he would suggest the planting of marram grass. mixed farm was not complete without fruit, vegetable, and flower gardens. plentiful supply of home-grown fruit and vegetables was an economical as well as a healthy diet. Attention should be given to the planting of useful and ornamental Tagosaste (tree lucerne) was easily and quickly grown, and trees and shrubs. useful as a fodder in drought times. Such trees as almond or olive were also worth a trial, the latter, though a slow grower, being both ornamental and productive. Good discussion by members ensued.

RAMCO.

August 23rd .- Present: seven members and two visitors. CARE OF HORSES .- In a paper on this subject, Mr. W. Crooks urged that, apart from humane considerations, the anticipation of high prices for horseflesh should impress members with the necessity for care and attention being given The food requirements of each individual animal should be these animals. studied. Fowls should be kept out of the stables. In suitable weather the horses should be paddocked at night in a suitable enclosure provided with feed. He thought no harm would result from allowing a horse to drink when it was hot, provided the animal was not over thirsty, and did not drink too quickly. Slow and fast horses should not be worked together. Mr. Lewis thought it unwise to allow a horse to drink when it was heated; other members agreed with the writer of the paper.

RENMARK (Average annual rainfall, 10.93in.).

August 26th.—Present: 13 members and three visitors. Horses and Their Treatment.—Mr. E. H. Birks contributed a paper on this The following is extracted therefrom:- "Mv firm's method through normal years has been to feed one kerosine tin of good chaff, including a double handful of bran, at 6 a.m., 12 noon, 5 p.m., and double that amount at This quantity each horse is encouraged to clean up before a is tipped in. Whatever class of feed is adopted, I lay par-9 p.m. fresh lot is tipped in. ticular stress on the regularity of feeding. Accustom each horse to his mealtimes, and he will learn to expect it then and be ready for it. Feed a horse too early, and he is likely to simply nose it over, knock a portion out of the manger, and leave the balance to sour from his breathing over it. He next comes in at proper time and finds it sour, noses more of it on to the floor, and picks it over. He therefore has not had his quantity, and tucks up before the next meal. who go in for the 'tip-in-a-bag' method would probably claim economy on finding chaff remaining in the feeder in the morning, but an observant person will soon explode such an idea. Chaff which has been breathed over by heated horses (after work) soon sours, and it needs nature's condiment, hunger, thickly applied to entice them to eat it. My firm secured some oaten chaff a few weeks back, which weighed 91bs. to the kerosine tin, whereas the wheaten chaff we had been using only weighed 6lbs. to the tin. This meant that we were giving 3lbs. extra of oats per feed, and we paid dearly for it. The horses manifested uneasiness in the collar, and investigation revealed little lumps over the shoulders, which we had been accustomed to call These came and disappeared for a day or two and the collar eventusweat boils. ally broke the skin, and the trouble we had with them was heartbreaking. I was assured by a doctor that the bad river water aggravated the trouble, and am pretty certain of that fact. But I blame the oats for it. They certainly have a higher amount of energy than bare chaff, but as I will endeavor to show, they need bulk adding to make an ideal feed. If a horse is given a concentrated food, he must have bulk to fill the stomach to avoid the appearance of a kangaroo dog about him. Concentrates may be all right for racehorses and such like (which are a waste of good feed to keep alive) who are intended for swift work, and therefore light weight; but for working horses I like to see a good, round belly. My firm has, since bran rose to a prohibitive price, made a rule of feeding green lucerne twice per week in lieu of bran. We required something to keep the animal's bowels free, and green feed certainly has that effect. Dry lucerne (hay or chaff) I have had little experience with, and that little was disheartening. I favor the idea of allowing horses to drink when they feel inclined (except, of course, when over-heated), but I recommend having the water trough some little distance from the feeders. I once inspected a stable where the manger contained both feed and water, but the animals used to slop their food and fill the water compartments with the washings of their Horses will not leave their feed to travel to the water trough till they need a drink, and that is when they should have it. Horses necessarily shut up, such as stallions, &c., should, in my opinion, be watered prior to feeding. Reading and observation of horses' ways have inclined me in this direction. A warm stable. clean and dry, with bedding for cold weather; room for a gallop when inclined; ventilation and shade in hot weather; well oiled or greased vehicles; neat fitting harness; spring tugs where practicable; well-trimmed and cleaned feet, shod regularly when necessary; good grooming, whip when required but not unless required, are all items to which we pay far too little attention, in spite of their being the horse's due.'' In the discussion which followed the reading of the paper, members stated that they had fed sorghum to horses at all stages of growth and had never known any ill effects to follow its use. The opinion was expressed that reported ill effects were probably due to feeding when stock were empty. Mr. Huggins, who had had a great deal of experience with teams "on the roads," considered bran an essential part of the horse's ration. It reduced the quantity of chaff used immensely. When carting from Terowie to Broken Hill, at a time when there were 1,000 teams on the track, he used to feed 200lbs. of bran to eight horses every 24 hours, and the loading used to average over 30ewts. to the horse. Pollard was a most dangerous thing to use. It foundered horses worse than oats. was much discussion on the subject of lucerne, green and dry. Mr. Muspratt said that "balling" was due to feeding at the wrong stage. When the lucerne was neither green nor dry, the bark stripped off and balled. Mr. Waters said that lucerne should be fed fresh cut and not wilted, but Mr. Basey had read that lucerne should always be wilted before feeding. Mr. Woodham's plan was to cut at night, When the lucerne was and feed next morning, and Mr. Muspratt cut in the morning, but cocked at once. Mr. Nuthall cut in the morning and put the lucerne in the shade, sprinkling salt For hay, Mr. Muspratt advised to rake lucerne with on it, for midday feeding. the horse rake immediately after cutting, and cock the next day. Mr. Nuthall raked into windrows after cutting, and cocked in the evening. Mr. Basey thought the best plan was to get it into the cock right away, in the summer; in the spring turning was necessary. For feeding dry lucerne Mr. Muspratt advised mosquito wire in the bottom of the bin, with an old slat to support it, to let the dust through. Mr. Woodham preferred perforated zinc for lucerne chaff. The best big stack of lucerne he had ever had was sprinkled with water and molasses when the stack was being made. Mr. Muspratt said a good plan when feeding dry lucerne was to put the hay out and sprinkle with water from a can for the feed ahead, this kept the Mr. Taylor spoke of the general South American practice of feeding horses on maize grain, and Mr. Muspratt stated that Mr. Madigan, one of the early settlers, used to feed his horses with lucerne chaff and cracked maize. related an experience to indicate the danger of drenching a horse through the nostrils, and Mr. Basey stated that he had found boiled linseed a cure for water A cupful of linseed should be boiled well for an hour in plenty of water. For sand, Mr. Nuthall recommended 11b. of sugar and a pint of paraffin with hot water, the belly of the animal being rubbed with a mallee rail or bar before the dose was administered.

WALLOWA.

August 19th.—Present: nine members. LAYING OUT THE FARM .- In a paper dealing with planning the farm Mr. V. Stone said the main objective should be to have all the paddocks opening about the same spot. A suitable site for the homestead generally in this district would be half way along the western or eastern boundary of the holding. This would obviate travelling over sand ridges when going to and from work. should be put down on high ground, even if on a sand rise. The house should be protected on the south and west by a windbreak. The stables should be located east or north-east of the homestead. The majority of fruits and vegetables could be grown in the district, therefore, a patch of ground handy to the bore should be selected for the purpose of a garden. It was as well to clear the best of the hold-An area of green scrub burnt off in summer would provide good feed. In each paddock should be left an area of scrub to provide shelter for stock; for preference this should be close to the homestead. A couple of 10 to 20 acre paddocks adjacent to the house would be advantageous. A firebreak to protect the Members, who discussed the subject at house and yards was a necessity. length, generally agreed with the opinions expressed in the paper.

WILKAWATT (Average annual rainfall, 16in. to 17in.)

August 21st.—Present: 10 members.

A paper on "Sheep" was read from the Journal by Mr. J. Ivett. Bowman agreed that it was wise to keep sheep, but he doubted whether their country would ever be a good feed country, and he questioned whether it would pay to grow forage crops for sheep. Mr. J. Ivett thought that their country would in The Chairman (Mr. A. J. McAvaney) favored time provide abundance of feed. the keeping of sheep, even if only to keep down the weeds on fallow land.

Neville suggested that rye grass could be sown with advantage.

LAYING OUT AN IRRIGATION PLANT .- In a paper with this title, the Hon. Secretary (Mr. W. J. Tylor) urged the adoption of some system of irrigation for the production of green feed for stock, and also vegetables for household use. site for the bore should, if possible, be on high ground, in order to secure a good pressure of water. The windmill selected should be strong, and should work smoothly in the slightest breeze. The latter property was most important, if a fairly regular supply of water was expected. Tank stands should be at least 10ft. from the ground, and where white ants were prevalent they should be constructed It was well to make stand provision for two tanks, as one 2,000gall. tank was not sufficient to provide much water for irrigation after allowing for the quantity required for livestock. Tanks should be of at least 2,000 galls. capacity, and should be provided with covers to prevent the entrance of insects and rubbish. The outlet should be in the centre of the bottom of the tank and connected with the downpipe by means of a flange bolted through the tank to a flange on the pipe by This arrangement three small joints with rubber insertion both inside and out. would prove more lasting and satisfactory than other methods of connecting the outlets with the side of the tank. The first pipe should be 1½in. to 2in. in diameter, and it would be found very convenient to run a pipe from that to the outside of the stand to enable tanks to be filled. A shower bath could also be very The 2in. pipe should be reduced down easily provided beneath the tank stand. to a lin. pipe at the ground level, and this size of pipe could be used for all mains. Square corners should be avoided in laying the pipes, as they tended to reduce the Stand pipes should be of lin. pipe, and should not be more than 2ft. With taps provided at every 30ft., and with the aid of 20ft. of hose, a large area of ground could be watered. In laying pipes, all joints should be treated with oil or pipe compound, so that the pipes could at any time easily be taken up. This also prevented the joints from rusting.

BERRI, September 22nd.—The subject of soil water in relation to plant life was discussed by members, and it was decided to make further investigations into the

matter of drainage of land.

LAMEROO, September 15th.—In the afternoon Mr. Henshaw Jackson, the Wool Expert, attended and delivered a lecture in the presence of about 50 members and visitors. In the evening the Poultry Expert (Mr. D. F. Laurie) addressed an appreciative audience on the subject of "Poultry and their Vermin."

MANTUNG, August 19th.—The Hon. Secretary (Mr. L. Pearce) read the report of the delegate (Mr. A. E. Tonkin) to the Tailem Bend Conference, and discussions took place regarding some of the matters referred to in the report. Messrs. A. E. Tonkin and D. Stewart, who had enlisted with the Expeditionary Forces were granted leave of absence until their return.

MYPOLONGA, September 17th.-Mr. S. McIntosh (Director of Irrigation) attended the meeting and delivered an address, at the conclusion of which he replied

to a number of questions put by members of his audience.

PARILLA, August 20th.—Co-OPERATION.—The Hon. Secretary (Mr. P. J. Browne) read a paper on this subject, and in the discussion which followed, members generally favored the principle.

WYNARKA, August 20th.—A paper dealing with wheatgrowing on a scrub farm was read by the Hon. Secretary (Mr. S. G. Williams). Some discussion took place in regard to the conduct of experimental work in the district.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

August 16th.—Present: 16 members and three visitors. FERRETS .- In a paper dealing with this subject Mr. R. Eglinton said:-"The ferret has for its immediate congeners in the genus Mustela the marten, the polecat, the stoat, and the common weasel, whilst allied to it are the otter, the badger, and the skunk. Of the mustelines proper, one's remarks the otter, the badger, and the skink. Of the inuscines proper, one's remarks regarding the general characteristics of form, habit, and nature of one is more or less true of all together. They all possess the same low muscular bodies, etc. They are all bloodthirsty, determined of purpose, and relentless; constitutionally hardy, prolific, foul of odour, yet withal of scrupulously clean habits, if given a proper chance. Their haunts vary only in having their peculiarities more or less pronounced. Between the martens and the polecats and the weasels there is a great difference as rgards dentition. The first have four pairs of pre-molars in each jaw; the last-named two have but three. There is no need to enter into any lengthy description of the person of the ferret; its yellowish-white body, sharp, intelligent aspect, and curious pink eyes are features which have made it universally known. There is also the polecat ferret, the result of a cross between the two animals. This partakes more of the outward aspect of the wild polecat, whilst retaining the general nature of the ferret. As a rule the cross is larger than the ordinary kind; but curiously enough the smallest ferrets seen are usually also of this variety. Opinions differ as to which is the better for work, but it is reasonable to suppose that, on the whole, polecat ferrets are more agile in pursuit than white ferrets, which points to their being more suited to rats than to rabbits; whilst the color of the white ferret is a merit which should never be overlooked in connection with rabbiting-especially in the hills where the ferns are thick. In regard to hardiness, breeding propensities, and such like matters, there is not much to chose between the two, both are more or less difficult to rear; but better and healthier progeny are obtained from a good strain of polecat ferrets than from the white, although they require more careful handling. A curious trait, worthy of note here, is that the ferret never appears to run really foul of any of its congeners. There is always a sort of armed neutrality amongst them; they never seem to fight, but to steer clear of one another. I have been told that in other countries where stoats and weasels are plentiful, many an ill-success with ferrets may be thus accounted for. When a pair of these animals is kept, a small hutch will be found most suitable; and on the other hand, a large hutch or two will be necessary. In either instance the most scrupulous cleanliness must always be maintained. Without this, and the necessary warmth, failure at first, and disaster afterwards must surely accrue. Slipshop dealings with these animals are always ill-advised. The hutch I suggest is one about 8ft. to 10ft. in length, about 3ft. wide, with fairly thick boards, standing on legs about 3ft. from the ground. This hutch is quite suitable without a division. It should have in. netting along the front, with a door at each end, a pit made of the same size netting in one end, and a small box in the other, in which the ferrets may sleep. . It is better, if a person has more than four ferrets, to have another box, rather than enlarge the one I have described. For feeding one should have earthenware dishes, such as are used for saucers for flower pots. Most boxes become thoroughly saturated with offensive moisture, but at the same time there is no satisfacturated with offensive moisture, but at the same time there is no satisfacture. tory means of meeting the difficulty except that of thorough and frequent cleaning. I do not at all hold with those who feed their ferrets solely on flesh Bread and milk should be the staple food, the other being an auxiliary. Stale bread must be used, broken into small pieces; boiling water is poured over this, most of the water squeezed off, then cold or warm-but not boiledmilk is poured over it, and it is given fresh and clean to the ferrets. Twice or three times a week some small birds, the healthy livers of ground game, or portions of a rabbit, without the fur, may be given. The heads or necks of fowls are also suitable; but never give any food in the shape of young or old fowls or game that has died from natural causes. Much of the disease among ferrets is caused by this kind of food. Also, under no circumstances give them the paunch of a bird or animal. One does not breed promiseuously from dogs or

poultry, and there is no reason why a haphazard line of operations should be adopted with ferrets. Two objects must always guide the breeder—one to produce a healthy strain, the other to produce the proper size and shape of ferret, especially for rabbiting, because the ferret at times gets a very severe handling. Small ferrets cannot do their work so well as medium-sized ones, whilst large specimens are, as a rule, slow and lumbering, although I have had some fine specimens in big ferrets. Always breed from parents of a strain of good repute and of good pedigree. Watch the effect of the crosses. When the strain shows evidence of diminishing quality, secure new blood; but, above all, breed up to a strain of ferrets. If one has both white and polecat ferrets, they should be bred separately."

BUREAU MEETINGS.—Mr. W. Turner read a short paper, in which he impressed on members the necessity for regular attendance at meetings, and more interest in the working of the Branch. He referred to the value of the Bureau and the Journal of Agriculture, and urged the introduction of new members to

the Branch.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

August 24th.—Present: 10 members and one visitor.

PLOUGHS AND PLOUGHING .- Mr. A. Broadbent read a paper on this subject. He said that when it was intended to plough land which was covered with weeds or grass, a pair of steady horses and a plough with a long mouldboard were essential in order that the growth should be turned in well. For clean ground, a short mouldboard was to be preferred, and the land should be ploughed not less than 4in. deep. He described the later types of orchard ploughs, which allowed of their use under In the discussion which followed, the branches of trees close up to the trunks. Mr. Hicks said that in their district, 6in. was a suitable ploughing depth for land intended for hay crops. He favored a plough with a long mouldboard. The Hon. Secretary (Mr. A. R. Stone) favored the use of the plough fitted with a reversible mouldboard. This offered many advantages for orchard work, more particularly where hillside work had to be undertaken. He also referred to the use of split links or spring hooks on the outside ends of the swingle bars, in order to avoid the damage sometimes caused to side branches of trees by the ordinary hooks. Hicks favored the use of short swings for close ploughing, and suggested using 3ft. to 6ft. of strong chain to connect the head of the plough and the swingle bar. enabled the horse to keep well clear of the trees. He thought 4in. was a sufficient depth for orchard cultivation. Mr. H. Jacobs favored cross-ploughing wherever possible in orchard work.

FOREST RANGE (Average annual rainfall, 35in. to 36in.).

September 16th.—Present: nine members.

Lucerne Growing.—The Hon. Secretary (Mr. O. S. Pollard) read a paper on this subject, written by Mr. H. H. Waters. The writer gave a short outline of the history of the plant, and referred to the world-wide reputation which lucerne possessed as a fodder plant. He had had five years' experience in the growing of lucerne, and was much impressed with its value. The Hunter River variety was generally best suited to South Australian conditions. Good seed and favorable sowing conditions were necessary in order to secure satisfactory germination, and it was advisable to sow on previously cropped ground in preference to virgin soil. Two floodings per year had produced excellent results. It was a good plan to give the lucerne a good watering a week or so previous to cutting, and to avoid flooding too soon after that operation. He believed in allowing the lucerne to lie for a day after being cut before feeding to stock. Lucerne was a valuable plant for growing on creek banks to prevent the washing away of soil; the roots of the plant penetrated very deeply into the soil, and were very effective in preventing washing. Messrs. H. H. Waters and F. Rowley also referred to the value of lucerne as stock feed.

HARTLEY (Average annual rainfall, 15in. to 16in.). August 25th.—Present: 19 members.

DRAUGHT HORSES.—This subject was dealt with in a paper by Mr. J. L. Forbes:—"One of the most important factors to the working of a farm is the draught horse, and is deserving of better treatment than the average farm horse

gets. He should be always kept in a fair working condition-not fat, but no Regular feeding is essential. When six months old ribs should be showing. the colt should be weaned and taught to tie up. At one year old he should be Get him in two or three days before the operation is to be performed and handle him. When he comes to be thrown for the operation he will He should be broken in when three years old. After not struggle so much. being caught-and this will not be difficult after the former handling-tie him up; a good strong halter is the best for this purpose. Go up slowly to him and slip the winkers on, putting the bit in his mouth after the winkers are properly fastened. Leave them on for two or three hours, when they should be taken off, and he should be given a good feed. Next day he should be treated in the same manner and taught to lead-first on the near and then on the off side. If he should hang back when being led through a gate or into the stable, have patience and go up to him and pat him and speak to him; no good will be done by trying to pull him—this only tends to make him worse. On the next day he should be taught to drive. It is better to have some one to assist. Put a pair of reins on the colt and each take one. After the first plunge or two he will find he cannot get away, and he will probably sulk and refuse to budge. Give him a sharp cut with the whip and keep him walking round, first one way, then the other: Do not let him trot. On the next day he could be attached to a log and driven round. After this he is fit to be put in the team for an hour or so. This is a much better way than just catching a colt and putting him straight into the team. Never have your team tugging their hearts out in any implement; rather put on an extra horse if available, and when hooking up horses in the team always pull the mane from under the collar. If this were done there would be fewer sore shoulders." The general opinion of members was that the colt could be set to work in less time than was mentioned in the paper. Reining-up and mouthing was also considered advisable.

FARM BUILDINGS.—In a paper on this subject, Mr. D. F. Westwood dealt with the planning of the farm homestead and appointments. The former, he said, should be placed about 150 yards from the other buildings, and should be surrounded by three or four rows of pine trees. Accommodation for horses, chaffbouse, barn, machinery, and fowls was described and dealt with, and the wisdom of having a flower garden was urged.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

August 25th.—Present: 13 members. SCRUB CLEARING.—In a paper on this subject Mr. R. J. Martin said that if low serub were thick enough to burn, the best way of clearing it was to run a fire through it in autumn. It should then be ploughed with a disk implement drawn Scrub up to 3ft. in height, even if not burnt, could be dealt with by disk implement. The land should then be cropped for a few succesby bullocks. the use of the disk implement. sive years, with the idea of preventing the re-establishment of shoots. If there were a doubt as to whether this class of land would prove profitable under wheat, after two ploughings, it could be dressed with manure and sown to oats or rye, to be fed off by sheep during the winter months. In this way, not only was the soil improved by the droppings, but the sheep would probably nip off young shoots. Hilly or stony patches could be profitably sown to wattles. Land carrying sheaoak, teatree, broom, and scrub gum to a height of 7ft. to 9ft. could either be rolled, or axed; the former being the quicker and cheaper. A fire put through when the scrub was dry and a crop of shoots had developed to a height of about one foot, would effectively check any new growth. Crops grown on this class of land should be grazed with sheep, for preference, or reaped; on account of the presence of stumps, &c., it would be difficult to use the binder. It should be ploughed with a disk implement drawn by bullocks. Grass land should be protected by clearing a few chains of scrub on adjacent boundaries. Large gums should be rung, and when dry, fired at the roots; explosives would effectively split the largest trees when down. Teatree, which generally grew in damp or swampy ground, could be destroyed by grubbing; the land would then grow summer grasses. If chopped off at the butts with a billhook, and burned when dry, sheep run on the land in large numbers would effect its destruction. Briars cut off with a slasher, and ploughed under with a stump-jump implement, could be kept down whilst a crop of

Continuous cropping, and grazing with sheep, would eventually hay was secured. Pulling out in winter by means of bullocks would also be found destroy them. satisfactory.

IRONBANK (Average annual rainfall, 33in. to 34in.).

August 21st.—Present: eight members.

HORTICULTURE.—Mr. C. A. Morgan read a paper on this subject. He said that grubbing should not be undertaken in wet weather, otherwise the operations involved would tend to settle the ground down into too hard a condition. The best plan was to grub the ground and plough it lightly the first year, and leave it in that condition until the following year; it should then be ploughed in the autumn before it became too stiff. If this plan were adopted, planting could be carried out more easily and more successfully. After heavy rains land required very thorough working, but care should be taken not to cultivate it whilst in too wet a condition. Drainage, also, was a matter requiring attention; land could hardly be too well drained. The meeting was held at the homestead of Mr. W. Coats, and members commented on the health and pruning of the fruit trees in his orchard. In reply to questions, Mr. Coats said that amongst young fruit trees he would recommend ploughing from 6in. to 8in. deep, but for trees in bearing not more than 4in. Pear trees, in his opinion, should not be pruned. He recommended peaches in preference to apricots for grafting on almond stock, but suggested budding instead of grafting.

KANMANTOO (Average annual rainfall, 17.90in.).

July 24th.—Present: 14 members and two visitors.

CO-OPERATIVE STORING SHED .- In a paper on this subject, a member expressed the opinion that a great saving could be effected by a system of co-operation. a first step in the direction of bringing about such a system, he considered it neces-These should be disary to erect storage sheds at all railway centres concerned. vided into compartments, and leased to bodies of farmers.

KANMANTOO (Average annual rainfall, 17.90in.).

September 18th.—Present: five members.

SAND DRIFTS .- A paper on this subject was read by Mr. R. S. Talbot. He said that large paddocks, which could be cultivated, should be sown in March or April, as soon as rain fell, after the land had been worked with the cultivator. and seed should be sown at the rates of lewt. and Ibush. per acre respectively. Bye could well be sown if it were intended to feed the crop down; if not, an early variety of wheat which grew quickly; no harrowing was required after sowing. Another good method was to cover the land with litter, such as stable manure, dirty chaff, and short straw. This should be spread fairly thickly, and if seed were distributed over the land the litter would prevent drifting, and enable the crop to Branches or bushes placed on the land would also present drifting to a great extent; thus encouraging the growth of vegetation. If suitable grasses were once instated, the roots would permanently prevent drifting.

> MEADOWS (Annual average rainfall, 35.52in.). July 27th.—Present: 10 members and two visitors.

POTATO GROWING .- In a paper dealing with this subject, Mr. A. E. Maidment stated that Snowflake variety had yielded better this season than Carmens. An area of ½ acre, dressed with six trolly-loads of stable manure and 1cwt. super. yielded 1½ tons more than a similar area dressed with 4cwts. super. only, each plot being seeded with Snowflakes. Planting should be done in December or January. As the Carmens were a quick-growing variety, and were generally ready to dig at the end of April or early May, there was less risk of rot. Although he had secured payable crops from light soils, black soil would be found most suitable for potatoes.

WHAT I HAVE PROVED .- Under this heading Mr. C. T. Griggs dealt with the necessity for attention to bodily health, and the part which diet played in promoting this. He referred to the values of different foodstuffs.

MILANG.

August 14th.—Present: 33 members and two visitors.

SHEEP FARMING .- Dealing with this subject in a paper, Mr. J. Pearce said:-"Although the Merinos are the most hardy sheep, they will not thrive in cold and wet country, neither under such conditions is the wool good. The Merino is grown for wool and not carcass, although we find some very large-framed Merinos grown in the Far North of our own State, where the country is dry and climate warm. With a flock of sheep on the farm there is no butcher's bill to pay, and they will always yield a handsome return. In our district, and in my experience, the progeny of the Lincoln crossed with the Merino is the best sheep. To secure these it is necessary to obtain a flock of Lincoln or Merino ewes. It is almost impossible to get the former, although the progeny are larger and develop earlier. The Lincoln is by far the better mother, and the percentage of deaths at lambing is practically nil. The Merino ewe is wild and not a good mother, and crossed with the Lincoln ram there is often difficulty in lambing and many deaths result. In the absence of Lincolns secure fullmouth Merino ewes, although be sure they are sound and from a good breeder. No breeder of any repute will sell his best maiden ewes, and the aged ones will give a better lamb and can be used for two seasons. Like care must be exercised in selecting the ram, which should have long wool, with plenty of crimp in it. Get a sound two or four-tooth animal with plenty of vitality. Around the lakes the best time to put the ram with the ewes is the end of November or beginning of December. See that the rams keep with the ewes, as often rams, especially the Lincoln, Leicester, and Downs, will be found in a corner of the paddock by themselves. From six to eight weeks is long enough for them to be together. If half their time is spent away from the flock poor percentage will be the result. If the rams do not take kindly to the ewes, yard them up for three or four nights a week. This cross will give a good lamb, which will mature early. The wool is dense, of a good average quality, and this year in particular has commanded top price. The crossbred wether at three years will weigh from 60lbs. to 80lbs. per carcass, and will yield 8lbs. to 10lbs. of good wool. If lambs only are the objective, the Shropshire can be crossed with the Merino. The lambs from these put on flesh rapidly, are well shaped, deep, and full in the flesh. The best for butchers and export lambs is the first cross from the Lincoln and Merino, again crossed by the Dorset Horn, Shropshire, or South Down. The progeny are of good size, and put on weight very quickly. The wool from either of these crosses sells badly, being short and harsh. The farmer should not sell his ewe lambs. After the first cross he must decide whether he will continue to breed for mutton or wool; if for mutton he must use the coarse woolled sire; if for wool, the Merino sire; but either should be pure bred. The Crossbred is the most profitable sheep grown south of Adelaide, in portions of the Hills, and around Mount Gambier. On the Crossbred ewe, a Lincoln ram can be used, the progeny of which will be a fine large lamb, developing into a good sheep, with wool rather coarser than the first cross. On the progeny of this cross the Lincoln sire can again be used, which will result in much coarser wool and a tendency towards the Lincoln. The farmer now possesses a large framed sheep with a tendency towards mutton. To secure a sheep producing a good fleece of wool, he should use a large framed Merino ram of the plain bodied type. The result will be a sheep commonly known as a Comeback, carrying a fine fleece, which is in such good demand to-day. The most profitable sheep is the most perfect the country will produce. This can only be secured by close attention and culling, and to do this it is necessary to know the points of a sheep thoroughly. The points of carcass-and they apply both to Lincolns and Merinos—are depth, girth, roundness of barrel, with ribs well sprung, thickness behind the shoulder, breadth of forehead, and width between the eyes, shortness of neck and legs, and general squareness of frame. To be advoided are the thin-necked, leggy, flat-sided, narrow-made, small-footed, ill-shaped animals, with prominent staring eyes and narrow, hard faces. The carcass of a first-class Lincoln should be covered with wool, bright, lustrous, and wavy, from 8in. to 10in. in length, free from fuzziness, and not matted. The topknot should be free from fuzziness, which denotes a Merino cross, and so does anything like wool on the face, which should be covered with a soft white hair. Horns also denote a cross of some sort. Many farmers quite spoil

their flocks by breeding from mongrels. This is one reason that farmers' clips are so unpopular with woolbuyers. The Merino demands a longer description. All two and four-tooth ewes must be culled, for it costs no more to keep a good sheep, cutting 9lbs. or 10lbs. of clean, greasy wool, than to feed a miserable runt with open fleece, cutting only 4lbs. At the same time, only good country can produce first-class sheep and first-class wool. A model Merino with a firstclass combing wool should be covered all over the back, belly, and legs with an even quality of soft, bright wool, extremely dense everywhere, filling the hand well when grasped. It should open freely from top to bottom; each fibre should be independent of any other; should they entangle or in any way cross one another, the cull mark should be put on. The yolk should be clean and glistening, and a sticky, cheesy, gummy yolk is to be avoided. The top of the wither should be a solid mass of wool; any sign of wool being short and leaving a furrow is a sure indication of a light fleece. A poor sheep in wet weather will often show a parting along the back, especially the very fine long combing class. If the tip "feathers" show any pointed tips, reject it at once; it arises from fibres of unequal length. Too often a nice quality of wool on the back is found with a coarse hairy breech and thighs. The difficulty of covering a sheep with a really even fleece is very great, but this is much to be desired. should be covered with wool right down past the knee joints, almost to the hoofs. The face of a model Merino should be of the well known soft creamy tinge, with the wool covering the cheeks and growing well down towards the nose. The shape of the sire's horns is an indication of the quality of his fleece. For example, the short twisted horn close in against the head belongs to the extra short-woolled variety; a well spread horn belongs to the longer-stapled, and has the advantage of allowing the wool to be shorn around the head. Get rid, by culling, of all mongrel or irregular sheep, breeding as regular a flock, with a fleece as even in length and quality as possible, evenness and quality being the chief things. Recollect that wool, like other articles of commerce, must be got up in the best possible style to secure the highest market price. Frequently a nice clip, on account of the skirting, sorting, and packing being badly done, sells at a reduced price, and the grower, instead of blaming himself, accuses the broker of sacrificing his wool, and next year tries another, with no better results. To get up wool properly the shearing floor should be smooth and level, of wood or stone, and kept well swept during shearing hours, as otherwise clippings and scraps of stained wool get rolled up in the fleece. The bellies should always be shorn off first and put into a bin or corner by themselves. No second clips should be allowed, but the wool should be closely and evenly shorn all over. A bad shearer will, by taking too large a cut, leave three-quarters of an inch sticking up on the shoulder or in shearing around the back, and then he cuts it off with a back blow. Large pieces of skin, too, are often cut off by the 'tomahawker,' and these have to be hand-picked by the manufacturer, or they break the delicate combing machines. When the fleece is shorn the boy who picks it up should put it carefully together, grasping it by the tail part, and not sever any portion, then throw it out flat on the table with the branded side uppermost. The table is so constructed, made with battens, as to allow any pieces to fall through. woolroller then takes off the discoloured parts all round, including the breech and the thighs if very seedy, and puts them in a separate bin, and they are The fleece must then have each side folded over until they branded as pieces. meet, and then, doubling over the tail and neck ends, roll up tightly, and it is ready to be baled up. String should never be used for tying, as it is not only unnecessary, but the fluff off hempen twine gets mixed with the woollen yarn and does not take the dye. It is absolutely necessary to pack crossbreds and Merino wool separately. Sometimes when only two or three crossbred fleeces are in the whole clip one or more has appeared when the buyer has examined it, with the result that he values it as mixed all through, and so the price would be 1d. to 1d. per lb. less. Pieces, bellies, and locks should, if the clip is large enough, be packed separately. Scraps of clean wool falling under the table should be picked out of the locks and put with the pieces. The farmer should himself always attend to the wool table, and to avoid such a loss as the above he cannot be too careful and particular in putting each sort of wool together, and if at all possible putting all fleeces into the bales. Putting any into sacks always means loss, as exporters will not touch them, and the wool scourers

alone buy them. All 'dry' sheep fleeces may be packed together in a small clip, or, if large enough, each sort separately. The fleeces must be placed in regular level tiers all round the bale; this prevents lumpy, soft bales. As each bale is sewn up it should be neatly branded with the owner's brand, with the description of the wool underneath. Some growers just dab on their registered brand, or with a brush make some ill-shaped letter. Buyers know well that this slovenly branding usually belongs to carelessly packed clips, and so form a bad opinion at first sight. So the farmer who intends to carry out the principle of producing the best article, and getting the highest price, must get or make for himself a set of small stencil plates. The first should be the name of his place, or some contraction of his name, distinct and easily recollected, say in 3in. letters; the next should be the description of the wool in 2in. letters; and then a set of number-plates 3in. size. No subject puzzles the ill-informed wool-grower more than the difference in the weights of his bales. Sometimes he fancies he is robbed, yet cannot see how. Generally it is accounted for by the evaporation of moisture from the wool. Excepting in the districts named, the Merino is undoubtedly the most profitable sheep, being very much hardier, standing more ill-usage, and being particularly well adapted to our climate. Some farmers only buy store sheep, and never breed any. To a novice who begins this way, a hint or two will not be out of place. Of the very first importance to a grazier is the capacity for fattening quickly. Let him bear in mind that wild wethers, accustomed to travel long distances, do not settle down contentedly in small paddocks. He should therefore choose quiet sheep, in preference to wild station-bred sheep. He should also avoid South-Eastern sheep, not only on account of their small size, for which the usual price partly compensates, but because they seldom fatten well, their constitutions being weak. The Port Lincoln sheep, too, seldom fatten well on this side of the Gulf. It often takes two years to do it, and they are then not first-class. They resemble South-Eastern sheep in size and constitution, and are not liked by the experienced grazier. Northern or Darling bred sheep are generally the best. Sometimes the grazier gets a lot which puzzles him on account of their never getting 'tip top.' On killing one of the poorest of them he will probably find the stomach filled with felted balls of irregular size, caused by eating indigestible food, especially old cottonbush during droughty seasons. If the sheep are young and the season early, with plenty of green grass, they will partially dissolve, but if old and the grass drying up, there is no cure except the butcher's knife."

MOUNT PLEASANT (Average annual rainfall, 26.87in.).

August 13th.—Present: seven members. DAIRYING .- In a lengthy paper this subject was dealt with by the Chairman (Mr. V. Tapscott). The cowyard and bails, he said, should be well drained, and for preference face south or south-east. In the centre of the yard, which should be lower than the sides, it was a good plan to excavate a tank, about 8ft. x 8ft. x 7ft., and line this with cement. Old straw or rubbish could be placed in this, and the drainage from the yard would be conserved for utilisation as manure. The bails, as well as the yard, should be paved, and limewashed two or three times each year. Whilst the Jersey was a good cow for milk and butter production, she was sensitive to the effect of cold and wet weather. With plenty of feed in the winter, however, this breed did well. The milking Shorthorn was, as a rule, quiet and easily managed, and seemed hardy. Cows with white teats were more susceptible to sores, and for this reason it was wise to avoid them, although a little vaseline applied to the teats of a cow fresh in might prevent their cracking. In that district the cows did well for seven months of the year on the grass; for the remaining period they should be fed on chaff, with bran or copra cake. About one-third of a pound of bonemeal should be given in the feed of each cow three times each week during the months they were fed on chaff. Mangolds, lucerne, and rye also constituted good feed for cows. Turnips, cabbage, kale, and rye, when out in head, would taint the milk; the same applied to ensilage, he said. In the winter months each cow should, if possible, be kept in the stall, and fed in nosebags, to obviate waste. Before milking the milker should see that the udder was cleaned of dandruff, hair, etc. The hair around the teats should be clipped occasionally. Care should be taken to thoroughly strip, especially those cows that had been in for some time. He then described in detail the method he adopted in testing his cows. Scrupulous cleanliness in connection with the separator was necessary. Creams of unequal temperature should not be mixed. It should be forwarded to the factory at least twice weekly. When the butter was manufactured on the farm, loz. of salt should be added to each pound; if this were not properly worked into the butter it would be streaky. Overworking, however, would cause it to become greasy. In discussing the subject members recommended brushing the udder and teats with the hand or a dry cloth, in preference to washing. Mr. Langsford advocated the use of bonemeal as a precaution against dry bible.

STRATHALBYN (Average annual rainfall, 19.28in.).

August 28th.—Present: 32 members.

A sample of first-class citrus fruit was tabled by Mr. Springbett, who mentioned that prior to the trees being cinctured a few seasons back they bore very indifferently; since this operation, however, regular crops of first-class fruit have been secured.

MANURES .- A paper on this subject was delivered by Mr. H. Follett.

SHEARING .- Mr. W. H. Cuming read the following paper on this subject:-"'The first thing to consider, if we have no shearing-shed, is the best place in which to shear our sheep. Having fixed on the building, it is necessary to clean away all chaff or any dirt that may be about, and keep the shed during shearing as clean as possible, for though the wool may be nice and clean while on the sheep's back, dirt soon spoils it, and the value will be reduced considerably. All shearing-sheds should have a pen with a grating floor, for one cannot keep the wool clean without grating when the sheep are penned up all night. After the sheep are shorn there should be a long narrow pen outside the shed in which to turn the sheep where they can be branded before being counted out. Get the sheep in say a week before starting to shear. Britch and crutch and take off all the stained pieces. The pieces will be damp or wet, so spread them out on a sheet, and when dry sew them in a bag and mark it "Stained P.C.S." That wool is then ready for sale, and will not get mixed with any other wool during shearing. When the sheep are being shorn see that the bellies are taken off first and put away from the fleece. Avoid second cutting as much as possible. Those little pieces of wool are of little value and would be just as well left on the sheep, only it makes them look badly shorn. Get shearers that can shear about 72 sheep a day—that is nine sheep an hour—and is quite fast enough to do the sheep in workmanlike manner. All bad cuts should be either well tarred or kerosined to keep the flies away. Culling.—There should always be weighing scales in the shed, and if most of the ewes are cutting say 10lbs. of wool, and one gets a fleece that will not go near 10lbs., put it on the scales, and if much under 10lbs. put the sale brand on that sheep. If any ewes are in lower condition than they should be, or scoured badly, their constitution is weak-put the sale brand on them. The hogget ewes should have about 20 per cent. culled out, and that should leave a very good class of ewes to breed from next season. Put the sale brand on the cull hoggets; if they will not pay to breed from do not keep them for wool. It does not matter much about culling the wethers, as farmers or graziers are not likely to keep wethers long after they get fat. Classing the Wool.—In small clips, say 15 bales or under, do not make a lot of different classes—a lot of the small clips are over classed. Draft the sheep before they go into the shed, shear all wethers at one time, then hoggets, and then ewes. If any fleeces are broken or faulty put them in with the first pieces. When baling up put all ewes in one bale and mark "Ewes," all wethers in one bale and mark "Wethers," hoggets the same way. Class the wool thus: Ewes, wethers, hoggets, 1st pieces, 2nd pieces, bellies, stained pieces, and locks. The above is for Merino sheep. If shearing cross-breds, mark bales "Xbred;" if long-wools mark bales for the sort of long-wools you are shearing. If you have only one black fleece, put in a small bag and mark it "Black." Do not put two or more classes of wool in one bale; it will pay to use a few more bales and keep your different classes of wool separate. Rolling.—Make your wool table about 6ft. by 5ft., and have the battens far enough apart, say three-quarters of an inch, to let all locks pass under the table.

When the fleece is spread out take off all the trimmings, bale the fleece up, and put into the press. Sort the pieces before the next fleece is spread on the Pressing.—When there are six fleeces in the press, jump in and tramp the wool tight. Do not put all the worst fleeces on the bottom and save all the best for the top (that is called 'topping' the bales); the buyers do not like it, and will average the wool from the bottom, and that will bring the price of the wool lower than it should be. Put the wool into the bale as it comes off the sheep, then the fleeces will be the same average all through the bale. not put more than 3cwts. in one bale; if more than that, the buyers think there is more than wool in the bale. Brand the bales with the name of the homestead-put the name in full, and should you get what you consider a low price for your wool, do not change the name, but try to get your wool up better next season. Number the bales from one upwards till all bales are finished; if any bags, go on numbering the bags. To get a downright good lesson on woolsorting, attend the sale your wool is to be sold at. Take a run down to Port Adelaide to the showrooms and see your clip opened out the day before the sale; you will then be able to judge if you are getting your wool up all right or not."

INMAN VALLEY, August 25th.—Mr. R. J. Martin read a paper on "Scrub Clearing," and some discussion followed.

MILANG, September 11th.—Co-operation.—This question was discussed by members, and after deliberation it was resolved to secure further information before coming to a decision. The suggestions made by the Yadnarie Branch in regard to show judging were also discussed and endorsed. Leave of absence was granted to Messys. A. J. Moar and John McMillan, who had enlisted for service with the Expeditionary Forces.

MOUNT BARKER, August 25th.—Tuberculosis in Stock.—Mr. H. A. Doudy (Government Stock Inspector) attended the meeting, and delivered an address on this subject. He explained the symptoms and diagnosis of the disease, and urged the systematic elimination of all tuberculous animals from the herds.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

August 23rd.—Present: seven members.

FORAGE CROPS.—Mr. A. Dow initiated a discussion on this subject. perience had proved Algerian oats to be the best and most reliable forage crop to grow for winter feed, and Italian rye grass was also a very useful winter fodder. The practice of sowing forage crops in the spring was a very risky one on account of the dry weather during the summer. He considered that the sowing of a small quantity of lucerne seed with the cereal crop was well worth a trial. Mr. J. T. He favored Halliday suggested turnips, carrots, and rape for spring sowing. carrots, which could be fed in conjunction with dry feed. Mr. J. Dow had tried growing rape with a small measure of success, and he thought oats would be more profitable. Lucerne dressed with heavy applications of farmyard manure, had produced a very fine growth of feed. Mr. John Riddoch thought the matter of the growth of forage crops was a very important one, in view of the possibilities of the lamb-raising industry. He favored Algerian oats for autumn sowing, and rape and kale for spring sowing. Mr. P. Ryan said that the worst shortage of fodder usually occurred in the summer, before the stubbles were available. Turnips and white mustard had previously been grown with success, but the practice had not been continued. The Hon. Secretary (Mr. G. F. Ferguson) referred to the important position occupied by turnips and swedes amongst the forage crops cultivated in England and New Zealand, and thought that such crops should have a thorough trial in their district. He thought that lack of thorough preparation

of the land was responsible for many failures. He had grown kale very successfully, but found that sheep preferred Japanese millet. The President (Mr. J. Dow), and Mr. Jas. Barry spoke in support of Algerian oats as the best folder crop for their district.

MOUNT GAMBIER (Average annual rainfall, 32in.). September 11th.—Present: 15 members.

GELDING AND BRANDING OF HORSES.—Mr. D. MacGillivray read a paper on this bject. He said that emasculation was done mostly in the springtime, from August to the beginning of December, because then, people said, there was any amount of feed and grass; but this was wrong. He stated the physiological reasons for his belief, and said that the operation horses had to go through would have a more injurious effect upon them in spring than at any other time of the There was no doubt that the proper time for it was from the end of January If the colt were in rather poor condition so much the to the beginning of July. better, and it was important that it should be in the yard without food for at least 12 hours before the operation. In a majority of cases such things as gripes, weak loins, and kidney troubles could be attributed to that very cause. In all his experience he never saw a stallion or a mare affected with gripes. The best age for the operation was when the colt was six to eight months old. By the system he adopted only one assistant was required, and he had to attend to the branding irons, &c. Mr. MacGillivray described particularly his mode of working, and produced an illustration showing his patent crush pen, and how it was used in the ope-The same rule applied to cattle; and when one wished to wild animal or dress a wound. When a colt was put into ration of branding. examine or handle any wild animal or dress a wound. the crush pen it should be blindfolded, and the brands put on, so that it would not know whence the pain proceeded. Mr. MacGillivray showed several plates in illustration of his process of binding the colt and casting him on the ground, and said they should dress the seat of operation before and after the performance with a 5 per cent. solution of carbolic acid, which could be prepared by adding an ounce of pure carbolic acid to every pint of water. Warm water was preferable. He opposed the use of clams and searing irons, and advocated instead an "ecraseur" made for the purpose. He exhibited an instrument, which he said required but little skill to use. In reply to a question Mr. MacGillivray said he always branded the horses before he put them down. The Chairman (Mr. Pritchard) said he always used the system Mr. MacGillivray spoke of, and found it acted splendidly. It was excellent for branding cows.

NARACOORTE (Average annual rainfall, 22.60in.). August 14th.—Present: 22 members and three visitors.

How to Make Farm Life Attractive.—In presenting a paper under this heading Mr. W. Staude referred to the value of ornamental trees, fruit trees, and vegetable garden in connection with the farm homestead:-"The average farmer," he said, "has not much time to spend in the garden, but if it is once started some of the members of the family will generally take an interest in it, and if there were more friendly rivalry attached to this sort of thing, as well as with most other things on the farm, there would be more interest taken in doing the work. It would become a pleasure, and leisure hours that are spent in other ways would be put into this work, and at the same time would go towards making the life attractive. man who farms for what is to be made out of it alone will never feel the attraction that there is in farming, and therefore the life will become more of a drudgery to him than a pleasure. The horses on the farm should be one of its greatest attractions, for every true farmer is a lover of horses. He will get a pleasure out of looking after his horses, working, and keeping them looking well. One man should not try to look after and work too many himself, or he is almost sure to neglect them, and will lose interest in looking after them. If a farmer has no sons of his own he should employ labor in the busy times of the year. Every farmer should take an interest in some other branch of the farm besides the growing of On most farms there will be found sheep, cattle, horses, pigs, and fowls. Some keep these because they are a necessity on the farm, but to make the life attractive a farmer must take a special interest in some of these branches.

sheep, for instance, he will breed to improve his flock, and in doing so will get more than the ordinary pleasure out of his work. The same will apply to any other Every farmer should have a little recreation, but not too much, or branches. things will be neglected. The womenfolk should have a conveyance that they can use, independently of the farmer, for he cannot always get away from his work, and life too much indoors at times must become very monotonous. There is one thing every farmer can enjoy, and that is reading in the winter evenings. To read a good book is not only a pleasure, but is educational, and the evening will pass very quickly. A farmer should be a member of the Bureau. If he takes an interest in it he will not only find it attractive, but will get a lot of useful information, which will help him along with the work on the farm. Whatever work is done on the farm should be done well, for how much more pleasing to the eye it is at the close of the day to look back over the work and see it done well than it is to look back and see it untidy. He should do his part, and A farmer must not worry. If things will not go along without worry they will not go along leave the rest. Besides, he will only make himself miserable, and everybody around him. If a farmer understands his work, and takes an interest in it the life cannot help becoming attractive.'' Members generally congratulated the writer of the paper.

Turnips.—Mr. Wray reported having sown an acre with turnips. On this he On this he put 40 old ewes, some with no teeth; within one month they were in killable condition, and there was sufficient feed to keep them for two or three weeks longer.

TINTINARRA (Average annual rainfall, 18.78in.).

August 28th.—Present: 13 members.

CO-OPERATION IN HARVESTING .- Mr. M. F. Hodge read a paper on this subject. as follows:--"As there are indications of a substantial harvest in South Australia, it occurred to me that a few remarks on the subject of how to cope with the gathering of the crops would not be amiss. A great number of our rural workers have gone to the war. That will naturally mean a shortage of expert labor at harvest time. To overcome this difficulty I suggest that we farmers co-operate. For instance, the prospects of a good cut of hay are assured, and I take it that all will avail themselves of the opportunity of getting in a good supply of hay. The hay can be cut, stooked, carted, and stacked in a very expeditious manner if the near neighbours assist one another. For instance, A has two binders and B has one, and between them they have 18 horses, which will allow the horses to be changed, and thus keep the binders going all day. Three binders should knock down 40 acres per day. As some of the hay crops are bound to be more forward than others, when A and B have finished cutting their own hay they could pull into C and help knock down his hay, and so on. If small long stooks are built the stookers can start putting up the hay immediately after the binders. And with small long stocks the hay will be ready to cart some days sconer than if put in big round stocks. Coming to carting and stacking the hay, A wishes to put 100 tons into his stack. The quickest way to erect the stack would be to have three wagons, with eight men—three on the stack, one to each wagon, and two pitchers in the paddock; by that means the stacker never need be idle. By the time the hay is finished with, the oats will be ready to reap. These can be dealt with most expeditiously by the harvester, and I suggest to those who have harvesters to co-operate and get the oats into bags quickly. The early wheats will be ready by the time the oats are harvested, and those who have late wheats could help the farmers who have early wheats to reap, and vice versa. Where the crops are reaped with the stripper, if we can keep the winnower going all day full-handed (i.e., four men) the heaps will be cleaned up much more quickly than if every man manages for himself. The carting of the wheat can be going on while the wheat is being cleaned, as some farmers have smaller areas under crop than others. Harvest entails a good deal of extra work for the housekeeper, and where the womenfolk can manage to help one another I suggest that they should do so."

TRY-

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Particulars as to charges for space on application to the Department of Agriculture, Adelaide.

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All communications to be addressed:

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultura Conference of River Murray Districts.

The first Annual Conference of Branches of the Agricultural Bureau situated on the River Murray has now been arranged to take place at Renmark on Tuesday and Wednesday, November 23rd and 24th. The Renmark Branch is responsible for local arrangements. The Director of Agriculture (Professor Perkins), the Director of Irrigation (Mr. S. McIntosh, who will deal with the subject of fodder crops under irrigation), the Horticultural Instructor (Mr. Geo. Quinn, who will speak on orchard pests), and the Poultry Expert (Mr. D. F. Laurie), will attend and address the Conference. In addition, members of the Advisory Board of Agriculture will be present. The question of soil drainage will be discussed, and time has been allowed for "Free Parliament." Members of the Renmark Branch are arranging for visitors to inspect the settlement prior to the opening of the Conference.

Useless and Harmful Weeds.

The appearance of strange weeds in the growth in various districts throughout the State has been noted by many observant agricul-These strangers have been more particularly in evidence this year on account of the extraordinary conditions which prevailed during the past season. It is quite possible that some of these introductions may, in the course of time, result in quite as much loss to landholders as is the case with those weeds which are proclaimed noxious. There is a general feeling that in some cases the eradication of the latter is now economically impracticable, but that, had they been systematically attacked before the area which they covered became so extended, they could have been comparatively easily dealt Agriculturists should, therefore, in their own interests, as well as in the interests of the farming community generally, forward to the Editor, care of the Department of Agriculture for identification, specimens of any strange weeds or plants which may make their appearance. Specimens collected should be complete, and when practicable entire plants should be forwarded. In the case of bigger plants examples of the leaves, including any that may grow at the base of the plant direct from the roots, should be included. It is very difficult to name plants that are not in flower. Where practicable fruits and seed pods should also be sent, for many plants cannot be accurately named unless these are included. Some rough form of pressing is desirable where possible. If good representative specimens were laid flat between pieces of blotting-paper, rough brown paper, or even newspaper, and a slight weight, say a large book, left upon them for a couple of days before posting, it would generally mean that the samples would be received in better condition. Any loose flowers, fruits, or seeds should be wrapped in an envelope or a piece of paper (those from each kind of plant separate), and the whole forwarded in a long envelope or brown paper package, with as little crushing as possible. A piece of thin cardboard should be folded round them to prevent damage in the post. The same general principles apply to bigger plants. Where whole plants are not sent the height and habit of the plant (i.e., bushy, shrubby, erect, &c.) should be stated in the covering letter. In these cases also flowers, leaves, and, where possible, fruits, should also be included.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphillis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious pneumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

Patriotic Funds.

In the last month's issue it was announced that a number of Branches of the Agricultural Bureau had made contributions towards the Belgian Relief Fund. In addition, the Iron Bank Branch has made contributions of cork soles, which have been forwarded to the military authorities, and the members of the Wynarka Branch have donated the produce from $25\frac{1}{2}$ acres to the South Australian Soldiers' Fund.

The Farm Library.

There has been a steady growth in the number of letters received by the Editor asking for information to be published in the "Inquiry Department" on matters appertaining to stock, general agri-

culture, horticulture, dairying, &c. There is a deep significance to this fact, in that it reveals an undoubted tendency in the direction of a demand on the part of the farming community for expert knowledge. In all cases of inquiry relating to diseases of stock, and in the majority of cases in which replies to other inquiries are sought, the practice is to send a direct answer by letter to the inquirer, in addition to publishing the information in the Journal for the benefit of other readers. Notwithstanding this, we feel that, on account of the distance, and, in cases, the absence of a daily mail service, the immediate value of this information is to a certain extent lost. More particularly does this apply to stock troubles, in connection with which the lapse of a few hours may mean the loss of a valuable animal. A partial remedy, however, is not far to seek. As each year's volume of the Journal is completed, an Index is prepared, and issued as a supplement. It will be seen on perusal of the Index to the 1914-1915 volume, issued with the September Journal, that the majority of the common troubles met with in stock in South Australia have been dealt with more or less fully. A reference to this in cases of emergency may save just those few hours which may mean the life or death of the patient. Farmers are well advised, therefore, to retain each issue of the Journal, and either have it bound, or themselves bind the issues together by means of a tape or string through a couple of holes 3in, or 4in, apart, about half an inch from the bound edge.

From time to time the man on the land, in the course of his reading, comes across information which he realises he may find of value at some time or other. Too frequently, however, this is carefully put away, and promptly lost. To obviate this, there are two very simple expedients. The farmer may clip particular points or articles from the paper in which they are published, paste them in a scrapbook, and index them; or, as an alternative, file them in separate folders under specific titles, such as "Dairying," "Ensilage," "Seeding Operations," "Harvesting," "Fruit Culture," with as many subdivisions as the particular case demanded. The latter idea has the advantage of involving less trouble at the outset, and provides for unlimited extension. A small but carefully selected library, together with a reference file similar to that referred to, cannot fail to be of value. This, with the addition of bulletins, leaflets, &c., issued by the Department from time to time should be the means of conveying valuable suggestions to the farmer who takes the trouble to intelligently index the information.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

Replies by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.

"S.H.," Wallaroo, has a cow which treads on her teats when getting up.

Reply:—Probably the best way of preventing this would be to hang a leather apron in front of the udder, which would prevent the teats being damaged. When they are, a little arnica lotion is the best thing to apply.

"Equestrian," Adelaide, seeks information relating to the cause and treatment of windgalls in horses.

Reply:—Windgalls are enlargements of the synovial sacs, lubricating bags, through which the tendons run in the neighborhood of the fetlock. When a horse is worked too young or too persistently, the quality of the oil deteriorates, but increases in quantity; hence the enlargements; a result is stiff movement. In the case of an old horse, treatment is not satisfactory. In a young animal prolonged rest, say a spell of three months, will set matters right. To ensure the rest, a blister is often applied. Hand rubbing and pressure bandages regularly applied are the best treatment for a horse in work. Sometimes the oil is drawn out by an aspirator, but as a rule it re-forms.

"T.S.," Cleve, has a yearling filly very lame in the near fore leg.

Reply:—The symptoms are more like those of a partial fracture of
the bone than of dislocation, and it would be best to leave the filly to
recover on her own. Arnica liniment might be rubbed in if desired.

"O.W.," Streaky Bay, has a colt whose front hoofs grow only at the heel.

Reply:—This club-footed growth is due to deficiency in growth of the horn of the foot and frog. It is doubtful if treatment will be profitable, but if desired, the heels should be rasped down so that the frog gets good ground pressure. The bars should not be rasped; the hoofs should be dressed daily with Stockholm tar, and a light blister applied round the hoof head. Ten drops of tr. arsenicum alb. should be given internally morning and evening for a month.

"G.T.," Geranium, has a mare tucked up, stiff, and losing condition, with slight griping.

Reply:—The symptoms rather point to irritation of the womb and metastatic laminitis. Try her with 10 drops of tr. nux vomica on the tongue each evening and 10 drops tr. pulsatilla each morning. It may help also to dress the hoofs with Stockholm tar daily.

"J.H.J.," Wirrabara, has a colt with swellings and abscesses on front leg after castration, which seemed to do all right.

Reply:—The castration was not to blame. The colt was out of sorts at the time and blood poisoning followed. Dress the leg daily with spirit of iodine and give a dessertspoon of photographer's hypo in drinking water twice a day for a few days.

"G.W.A.," Lameroo, asks for a means of rearing a 48-hour-old calf without milk.

Reply:—Two days is a bit early to knock off milk, and the calves will not do well to profit without it. Use dried or condensed milk for a week, gradually adding a little oatmeal and linseed meal, about a gallon to a gallon and a half of skim milk a day, and an ounce or two of oatmeal made to a gruel, and less linseed; the feeds should be given at least three times a day. If scouring sets in add a pinch of bicarbonate of potash to each feed, which should be warm. After a week or two put the calves on to a good proprietary calf meal, obtainable through any store. Give dry hay rather than lucerne to start with, and never let the calves on to wet lucerne.

"H.H.D.," Langhorne's Creek, has a mare with the leg swollen from injury. He has been rubbing hock with an embrocation.

Reply:—A good deal of the swelling is from the application. Foment well with hot water twice a day, and apply after a little of a mixture loz. tr. arnica to 1 pint olive oil. Probably a week's treatment will effect an improvement.

"J.H.M.," Willunga, reports a cow as having lost her cud.

Reply:—Give a pint of yeast daily for three days, and three times give 20 drops tr. bryonia.

"C.H.C.," Wirrabara, reports that a horse rubs hair out of its tail, which is seurfy.

Reply:—Probably whipworms. Give half a pint of castor oil in half a pint of warm milk as a drench, and inject a quart of warm milk with three tablespoons of turpentine in it into hinder gut. After, give the horse a tablespoon of sulphur in feed once daily for a fortnight.

He also has a pig with sores on the back.

Reply:—These appear to be ringworm. Dress them daily with spirit of iodine, and give the pig cinders and a teaspoonful of sulphur daily in the food.

"E.O.J.G.," Spalding, has a cow with inflammation of the udder. swelling increased along under the body, and the joints of the hind legs became puffy.

Reply:—The symptoms point to snake bite, and are not those of any contagious disease. Keep the udder clean with soapsuds, and dress daily with spirit of iodine. The cow will lose the quarter, most likely, and if very painful sling in a bag tied round the loins to relieve the weight.

"E. Bros.," Auburn, have a pony mare which fidgets with her feet, which appear very tender.

Reply:—Probably slight laminitis. Give two packets of Epsom salts each evening in feed, and put her on poorer feed if possible. Rub Stockholm tar into hoofs daily.

"H.C.," Farrell's Flat, had a horse go lame, and then break out at the heel.

Reply:—This is more likely to be villitis than greasy heel. Dress daily with the juice of half a lemon and apply camphor ointment afterwards.

"F.R.," Forest Range, has a horse three years old, with the skin of the heel cracking, scaly, and with hair standing off.

Reply:—Greasy heels can be cured, but the affection is probably villitis, which is constitutional and difficult to cure. Give a table-spoon of Fowler's solution of arsenic in feed once a day for three weeks, and once daily dress the heel and hoof-head with the juice of half a lemon.

"A.J.D.," Keith, had a colt which apparently recovered from strangles, was castrated, and has since developed abscesses.

Reply:—This trouble frequently follows the operation after strangles and there are generally internal abscesses as well. Foment the swellings with some mild antiseptic, such as washing soda, and give half an ounce of photographer's hypo in drinking water daily for a week or so. The trouble may hang about for some weeks and require periodical repetition of treatment.

"W.H.P., jun.," Long Plains, had a light filly, which cut the sinews of the hind leg, blood poisoning following.

Reply:—The case is not likely to do well, but dress the wounds twice daily with spirit of iodine and dust after with chlorinated lime one part, Fuller's earth seven parts, and sling in crush pen, grooming well every day and increasing walk as able. days give an ounce of photographer's hypo in drinking water once or twice a day. The same correspondent also has a mare which strained the hind legs. The animal is hard in the mouth. The long spell suggested will be the best remedy for the sprain, but if the exact locality is known it would be advantageous to rub in a liniment made of one ounce of tr. arnica to a pint of methylated spirit every day. To remedy the hard mouth, hands are chiefly wanted, but a rubber bit or a piece of hose pipe wrapped on a jointed snaffle will often help, a rein loosed round the bar of the bit on either side crossed over the nose, led through the ring of the bit on the opposite side, will bring the head in to the chest, while the reins in the rings can be used to guide without pulling hard, which so often induces contra pulling in the horse.

Salt Creek Agricultural Bureau ask whether hay that had become heated was injurious to horses.

Reply:—Heated or mow burnt hay, if fed exclusively, upsets the digestion and kidneys, but it may be used judiciously mixed with sound hay, say up to 10 or 15 per cent. by weight, and is then relished by horses.

"H.H.D.," Langhorne's Creek states that a colt, two years, came in with other horses, drank, staggered, groaned, fell, and died; badly swollen about an hour.

Reply:—Probably hurried in with the rest and drank on a full stomach, distension of which stopped the heart's action. It is not feasible to puncture this organ in the horse and the symptoms are not those of any infectious disease.

"J.P.O'S.," Wilkawatt, reports a horse suffering from pain in the off hind leg, fever, irritation of head, with the urine from a brown to red color.

Reply:—The attack is a blood and kidney disease called purpura haemorrhagica, rest and good feeding are necessary, and about a tablespoon of the following mixture should be put on the teeth two or three times a day:—Sulphate of iron, one ounce; venice or common turpentine, one ounce; or two tablespoons Stockholm tar, one quarter of pound; treacle or honey, half a pound. It is quite likely

the head and breast and belly and legs will swell, and it will take the horse about a fortnight to get well again.

"E.G.W., Beltana, reports that a cow was bitten or stung on the udder by red-back spider; much swelling and some pain resulted.

Reply:—The bathing was good treatment and the onion would have done good if thought of earlier. If by the time this reaches Beltana the swelling is still large, onion poultices will be best, but probably it will have subsided by then. If there is any hardness left it will be well to foment frequently with hot soapsuds in which a little glycerine has been put. Most spiders bite, but some eject an acrid fluid from glands behind, which causes painful sores. Scorpions sting.

"G.F.G.," Petina, states that a filly, rising three, after quietly working for several weeks became very excited.

Reply:—The symptoms are due to horseing, and the best treatment would be to mate her. If this cannot be done a teaspoonful of bromide of potassium once or twice a day in food for a few days would have a sedative effect on the nerves.

"C.E.M.," Parilla, states that a light mare, three years, has barbed wire cuts in front of hind shinbone, the sinew being cut into.

Reply:—At three there is every prospect of a good recovery and the sinew knitting together. Dress twice daily with spirit of iodine, and if flies are troublesome dust with boracic acid seven parts, sulphur one part. The filly will do better out in the paddock.

"P.H.K.," Clare, reports that a cow cut her teats badly with harbed wire, and seeks advice.

Reply:—For a severe cut as described some sort of collodion is necessary—probably the handiest would be one of the preparations known by such names as "new skin," or if made at home, bicycle cement or oak varnish, with a little tr. calendula added. The collodion should be painted on in successive coats till a firm skin is formed: a little boracic acid may be dusted on after. The treatment should be repeated as often as seems necessary. Boracic cintment, with one-eighth part Venice turpentine, is a good healing cintment. As the cow is a hard milker, it would be well to milk with the syphon only for a few days till healing is well set in.

"A.C.B.," Coomandook, reports that a foal had a damaged hind pastern, probably from a kick.

Reply:—The young bone and oilsacs of the tendons were damaged, and probably if a good coat of Stockholm tar is applied to the joint every few weeks the swelling will disappear.

"E.H.P.," Wirrabara, states that a 13-year-old mare takes the horse repeatedly without conceiving.

Reply:—At her age it is quite probable the mare will not breed again owing to disease of the generative tract. Next time she is tried let it be in the evening after a stiff day's work. Swab her out before service with a flat teaspoonful of boracic acid dissolved in a quart of warm water, and directly after service take away two quarts of blood from the jugular.

"A.F.," Mount Gambier, has cows with warts on the teats and teats blocked.

Reply:—If using the syphon for the blocked teat is not satisfactory, it would be well to get one of the local practitioners to cut out the little fibrous tumor which is causing the trouble. For the warts, have the big ones cut off and seared, and dress the smaller ones daily after milking with castor oil one day and vinegar the next.

"H.G.K.," Morchard, reports the sudden illness of a five-year-old mare, which died without a struggle 12 hours later; had eaten wild poppies.

Reply:—It is not likely that the poppies actually poisoned the mare although indirectly they may have contributed to her death, which was probably due to peritonitis, brought about by internal injury. The fear of lying down or rolling is characteristic of this disease.

"W.H.B.," Mundoora, has a mare which has had a hip down for four years, and he asks whether she could be bred from.

Reply:—The trouble is that the pubic bones have not come into proper position after foaling, and so much time having elapsed, there may be a permanent deformity internally that would interfere with the passage of the foal, but, speaking generally, a mare so affected can be bred from.

"J.D.H.," Nhill, reports that sheep, mostly ewes, after dewy night only, froth at the mouth, stagger, go mad, and die. P.M. swell very rapidly, organs dark (probably fluid in cavities, though not stated).

Reply:—The symptoms are those of sarcosporidiosis, a parasitic invasion of the muscular tissue. If more die, kindly send, in spirits, a few inches of the last stomach and first bowels and a few inches containing dung of large bowel for microscopical investigation. Prevention.—Yard when dewy. Move frequently, not leaving more than three days in one paddock. If hand feeding available, give salt and sulphate of iron, one dram each per sheep, in chaff for a few days. Bleed stricken sheep at eye vein, and give carbolic acid one dram (teaspoon) in glycerine one ounce (tablespoon). Liming wet parts of pad dock will be useful.

"F.C.," Coonalpyn, states that a cow freshly calved is hard to milk, and one quarter is hard.

Reply:—A slight attack of mammitis or inflammation of the udder. Try fomenting three times a day with hot soapsuds. Give the cow 4h. Epsom salts and an ounce of ginger in a quart of beer. If the cow is blind in the quarter do not try to milk it.

"H.S.," Charlton, via Port Lincoln, has cows which are stiff in hind quarters, walk sideways, pass much urine, stand when helped up, but cannot walk much.

Reply:—A form of meningitis, due to eating yacca. The cows will probably improve if they get a tablespoonful of this mixture two or three times a day for a week or ten days. It may be put in their mouth or mixed with a little gruel or molasses and given as a drench:—One-quarter pound each of sulphate of iron, sulphur, saltpetre, and powdered nux vomica, 1lb. each of brown sugar and linseed meal.

"T.B.," Carrow, had a horse in a heavy road-roller for 12 hours. It could not work, was taken home nine miles, continually tried to pass water, given Berg oil and saltpetre, inverted rectum, and died.

Reply:—The treatment was merciful, because it hastened death. Long heavy work is the most prolific cause of twisted bowel, which was probably the trouble here, and nothing would have saved the horse. A better treatment would have been veterinary chlorodyne or gin and peppermint.

The same correspondent also had a horse which was staked inside fetlock of hind leg. It healed up quickly, but after some months the wound has broken out afresh and emits matter.

Reply:—Where the flesh protrudes insert a small piece of thin wire and find where it goes to, then take a sharp knife and open out in the direction of the tendon, taking care only to cut through skin; probably a small piece of the stake will be found. Treat afterwards with daily dressing of spirits of iodine.

"S.," Carrow, has a horse which has apparently put out shoulder. The animal is not lame.

Reply:—The injury is somewhere else in the leg, as the shoulder cannot be put out without the horse going on three legs, but the muscles waste for want of use. Give light work and rub the shoulder well for ten minutes every day.

Also a horse pants after work at certain periods of the year.

Reply:—As these are the periods of dry feed the horse is broken winded, and nothing much can be done except to feed little and

often, and not give dry, dusty food or excessive work. Four table spoons of raw linseed oil in the food will help if given once a day for a month or so. Green feed is the best treatment.

"P.A.G.," Spalding, has a filly two years, which is weak, swollen about the teeth and jaws, which are whitish.

Reply:—Anaemia and worms, probably of several varieties. Feed well as at present, but give a few pounds of oats daily in addition. Mix a quarter of a pound of each of the following:—Sulphate of iron, saltpetre, sulphur, and gentian, with one pound of sugar and one of linseed meal, and give twice daily a tablespoon fairly heaped in food for a fortnight.

"W.J.S.," Strathalbyn, reports a ewe as having been very poor. After death lumps were found near the kidney between the lungs and on the windpipe.

Reply:—A case of multiple abscess or lymphadenoma, a disease unfortunately very prevalent among sheep in South Australia. The lumps received were caseating renal, mediastinal and bronchial glands. A sheep so affected found in the slaughterhouse is known as a "potter," i.e., for boiling down. Early symptoms of the disease are shown by thriving young sheep staggering and dying, swelling up very quickly, and having a large quantity of fluid in the body cavities. Prevention is subdividing of paddocks and not overstocking.

E.T.W.," Lameroo, had a mare which had difficulty in passing dead foal, did not clean, seems foundered, afterbirth removed.

Reply:—In case of a mare, if the cleaning does not come away in a few hours it should be removed. Although some mares may be all right, the majority will founder if this is not done. The proceeding is to take the dark inner part between the cleft of a stick and wind it on, leaving the lighter and thicker part, which will eventually disappear inside, and then all come away together without much difficulty and no hard pull. The foundering is what is called metastatic laminitis, and occurs very frequently in such cases as this. The treatment will be to soften and cool the feet with poutices (pug clay or Stockholm tar), to insist on the mare's moving about frequently during the day to enable the veins of the feet to resume their work, and give 10 drops of tr. aconite three times a day. A good average dose of veterinary tinctures is ten drops; three of these will do more good than one of thirty.

"E.G.C.," Kulde, has a mare with a punctured wound behind shoulder; healed well, but has left hard lump.

Reply:—Probably a bit of dead tissue has remained in the bottom of the wound, and it would be well to open it at the bottom and probe it well with the finger, and remove any hard substance that may be felt, which will probably be a bit of gristle; then treat with spirit of iodine.

"I.E.S.," Bute, had a filly foal, which died at a week, after gradually missing teat, although drinking when milk offered. Difficulty in passing water. On third day scab of navel fell off, and water trickled away. No sign of a bladder on post mortem; only a pipe from navel to urethra.

Reply:—The condition is technically known as a pervious urachus. One part of the navel string is the outlet pipe of the bladder during life in the womb, and eventually becomes the lower ligament of that organ when the navel closes. In the present case, owing possibly to inherent tendency or hard keep, this pipe remained open, so that the bladder did not develop, and it shows observation on the owner's part that he tracked the passage. It is more than probable that there was also an open passage in the heart, which had failed to close; this would account for the foal's behaviour. Often in the condition noted a little irritation, such as a mild blister, or even a little mustard applied to the navel, closes the pipe, and the bladder takes on its natural function.

The same correspondent has a yearling filly with a navel rupture as large as one's fist.

Reply—Keep the filly empty over night, throw her on her back, return bowel into belly, pass a wire skewer athwart the opening close to the belly wall, lift the skin by it, and pass another fore and aft nearer the belly wall; draw the skin tight by skewers, and wind between them and belly three or four feet of cobbler's wax end. Fasten, cut off points of skewers, leave to slough off, when rupture will have closed in about eight or 10 days.

"G.W.S.," Yabmana, has horses with small hard lumps like marbles on the shoulders.

Reply—The swellings are enlarged glands, and if the horses work hard will probably cause stripped shoulders. Give a tablespoon of sulphur in the food once daily for 10 days or so. Slit the skin just at the back of the lump, and take out the gland; treat with spirit of iodine. By removing them by a slit behind, the horses can go on working.

"F.A.B.," Yabmana, has a filly, two years, which was noticed standing dazed in a creek, stone blind; eyeballs bloodshot, and bleeding at ears and nose.

Reply—The symptoms are those of concussion of the brain, due to a fall down the creek. If no blood clot has formed on the brain the eyesight will probably be restored; it is impossible to say without seeing the beast. Ten drops of tr. arnica on the tongue night and morning might help recovery.

Advice on veterinary matters has also been supplied to the following:—R. and F. McF., Port Lincoln; Wepowie Agricultural Bureau; L.H.T., Laura; Borrika Agricultural Bureau; F. McI., Binnum; P.W., Wirrabara; E.W.B., Sedan; T.H.B., Yongala Vale; E.W.P., Koppio; R.H.R., Moonta; L.L.McN., Pillala; W.K., Warnertown; A.W.J., Canowie Belt; A.D.M., Angas Plains; W.K., Verran; M. Bros., Sandy Creek; W.P.F., Willowie; G. J. Tohl, Yongala; A.S., Payneham; B., Wirrabara; Mount Remarkable Agricultural Bureau; J.S., Morchard; W.H.B., Mundoora; G.C., Morchard; H.H.H., Petina; J.R.M., Yareowie.

AGRICULTURAL INQUIRY.

HANDLING HAY.

The Spalding Branch of the Agricultural Bureau asks.—(1) Whether hay lost any of its feeding value when it lay unstooked until it became wet, and (2) whether sun-bleached hay lost anything in addition to its color, and whether this was regained in the stack.

The Director of Agriculture replies:—"Any hay exposed to rain deteriorates; heavy rain will wash out from the more or less porous tissues of the hay soluble matter of high feeding value, leaving behind the more or less indigestible skeleton of fibre. Sun-bleaching toughens the tissues and probably renders the hay less digestible; color returns to a certain degree in the stack. In principle, hay should be stacked away as soon as circumstances permit and sheltered from both sun and rain."

BLACK APHIDES ATTACKING STONE FRUITS.

Lameroo Branch of the Agricultural Bureau report fruit trees "affected with a blight, like little black insects."

The Horticultural Instructor (Mr. Geo. Quinn) says:—"I suspect the insects to be black aphides, which attack stone fruit trees, particularly the peach. The remedy commonly used is tobacco and soap wash applied hot with a syringe or sprayer. For a small quantity use, say, one stick black tobacco and about 2 ozs. of soap to 3galls. of water. Mascerate the tobacco into 1gall. of boiling water, and simmer it for an hour or two to extract the nicotine. In the meantime dissolve the soap in another gallon of boiling water, and then strain the

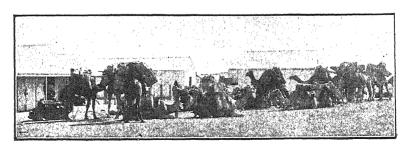
hot tobacco extract into the soapy solution and use it hot, taking every care to hit every insect with the spray. Two sprayings within about three days are desirable to catch those insects which are missed before they can breed up a fresh lot, as usually they are all females at this stage."

CURDS AND WHEY.

In reply to an inquiry asking the best and quickest way of converting separated milk into curd, the Dairy Assistant (Mr. H. J. Apps) says:—"Separated milk may be coagulated or thickened by merely allowing the milk to stand for a time and then heating and at the same time stirring it until the milk has separated into two component parts, viz., curd and whey. The milk will thicken more readily if held at a temperature of 90 deg. F., or one may heat the fresh separated milk to 90 deg. F. and add rennet (liquid) at the rate of 3½oz. per 100galls., say, for 20 gallons use 5½ teaspoonfuls of rennet diluted with a pint of cold water; stir this well into the milk for a few minutes, and allow it to thicken, which will generally take from one to one and a half hours with the fresh milk. Then cut or break the curd into small peices, heat the bulk up, and gently stir for a time. Allow it to settle, and then run it through a sieve and collect the solid matter.

PLANTS IDENTIFIED.

Plant specimens have been forwarded and identified by the Botanist (Professor Osborn) as follows:—Colton Agricultural Bureau, Brassica oleracea; Coonalpyn Agricultural Bureau, wheat showing mycelium of takeall fungus Ophiobolus graminis; T.E.H., Butler, Trifolium sp. (specimen incomplete) and Trifolium tomentosum; Roseworthy, Medicago minima.



Camel Team, Oodnadatta.

THE CROSS-FERTILISATION OF WHEATS.

By W. J. Spafford, Superintendent of Experimental Work.

In an article on the Improvement of Cereals, by Professor A. J. Perkins and the writer, which appeared in the issue of the Journal of Agriculture of January, 1908, it was stated that "as a factor in the creation of new varieties we attach far greater importance to selection than we do to cross-breeding." This was a little over seven years ago, and in so far as the farmer generally is concerned, I am still of that opinion. There are, of course, exceptions to this, but they are very few, both in actual numbers and also proportionately, as one will realise if one considers the enormous number of producers of wheat there have been since man first realised his power of cross-fertilising plants, and the very scanty number of names that have come down to our time as originators of improved new varieties as the result of artificial cross-fertilisation.

At the present time many farmers quite capable of being efficient plant breeders will not attempt such a thing, but think and say that the State should do all of the plant-breeding that is necessary. Although the positions are quite analogous, one never hears the same thing from producers of livestock. That it is within the reach of farmers to become accomplished in wheat-breeding is seen in Australia by the productions of a number of them, the most conspicuous being the late Mr. W. Farrer, who was unusually successful in the production of useful new wheats by cross-fertilisation. The late Mr. Farrer did all of his foundation work while he was in occupation of a small farm, and before he became an officer of the Department of Agriculture of New South Wales. In our own State the producers of new cross-bred wheats that have been commercially successful have been farmers, the best known of whom are probably Mr. R. Marshall, of Wasleys, and Mr. J. Correll, formerly of Yorke Peninsula, but now located in Western Australia.

If only two or three successful wheat breeders appear in each generation in this State, they possibly will keep us abreast of the times, but if more should come into the field, so much the better for our chances of making marked advancement in the production of varieties of wheats suitable to our particular conditions.

As I have already stated, for the ordinary wheat breeder selection is safer and surer for the permanent improvement of varieties, but it seems to appear to most growers as a more or less automatic drudgery, entailing an enormous amount of work. As such it is not in the least enticing to them, whereas the

raising of new varieties in a comparatively short space of time by the "wonderful and mysterious" art of cross-fertilisation is attractive to practically all. This respect for the mysterious appears to be natural; we hanker after that which we do not quite understand, and the mere cross-fertilisation of a plant is so often held up as a most difficult operation, and one capable of achievement by but very few, whilst the really difficult part, the "fixing" of varieties when once produced, is usually left unexplained. That the operation of bringing about the artificial cross-fertilisation of a wheat plant is by no means magical I hope to show; but the work that follows this, the "fixing" of the new varieties produced, is by no means such a simple matter, and really needs more detail work than that which alarms so many when ordinary straight out selection as a means of improvement is advocated. This holding up of plant-breeding by artificial means as a more or less mystical attainment, besides fascinating people, has also had the effect of unnecessarily frightening them, because the learning necessary for its accomplishment was naturally thought to be great. Certainly the better knowledge of the natural laws applying to breeding a person has to start with, the simpler the work will be, and the more likelihood of success in a given time, other things being equal; but where would we have been if all of our animal breeders had waited until they had attained this learning? So many breeders of animals have started off with only that knowledge that we usually speak of as "natural judgment." As they have progressed they have learnt in the only way possible, from their own experience and from that of others. There are plenty of farmers with the necessary "natural judgment" for wheat-breeding, and if they once set about it will acquire the necessary knowledge as they advance.

ORGANS OF REPRODUCTION.

The organs of reproduction of plants are not nearly so generally understood as those of the larger animals, so, before describing the operation of cross-fertilisation, some idea of these is necessary, and also some description of the happenings in the case of the natural fertilisation of plants.

THE HEADS OR EARS OF WHEAT.

What are known as wheat heads or ears are situated, one at the top of each stalk of the wheat plant, and, as a rule, quite unattended by leaves. They consist of congregations of flowers usually known as spikelets, arranged alternatively to the right and left in notches, on a more or less flattened central stem known as the rachis.

SPIKELETS.

These spikelets or congregations of flowers consist of a small stem, to which are attached alternatively, individual wheat flowers or florets; the number of florets in each spikelet varying from 1-3 in the base and apex spikelets, to as

many as eight or nine, but more often 5-6 in the central ones. Each spikelet is more or less enclosed in two stiff bracts known as the "outer glumes," which form part of the well-known "cocky chaff." These outer glumes are for the general protection of the whole spikelet, and more particularly as a stiffener for it.

FLOWERS.

The flower of the wheat plant consists of two enveloping bracts known as the "flowering glumes," in which are completely enclosed the principal organs of the flower, i.e., the organs of reproduction. These flowering glumes which form the bulk of the true cocky chaff at harvest time, fit one in the other, and as the inner one is always uppermost, they are known respectively as the "inner or upper flowering glume" and the "outer or lower flowering glume." When both male and female organs are present in the one flower, that flower is said to be hermaphrodite—the same term as that applied to animals having both male and female organs. The flowers of the wheat plant are hermaphrodite, and the female organs consist of the ovary or immature grain to which are attached two feather-like organs known as stigmas, whilst the male organs consist of three pollen sacs or anthers on short slender stalks.

FERTILISATION OF A FLOWER.

The fertilisation of any flower consists in pollen grains which are contained in the pollen sacs (male organs) at a certain stage of ripeness, coming in contact with the stigma (female organ) when it also is in a certain state of maturity. Charles Darwin has shown very clearly that most hermaphrodite flowers, *i.e.*, those having both male and female organs, have their organs so arranged by Nature as to avoid self-fertilisation.

FERTILISATION OF THE WHEAT FLOWER.

Wheat and many plants of the same natural order, although they have hermaphrodite flowers, are not so formed; indeed they appear to be so constructed that, excepting extraordinary accidents, self-fertilisation must take place. In the wheat flower the lower flowering glume is a fairly stiff and strong hollow bract, whilst the upper flowering glume is a softer, almost transparent bract, with turned-back edges. These two so fit together that the turned-back edges sit against the inner surfaces of the lower glume. So close is this fit that in the great majority of varieties the junction of the two glumes cannot be seen with the naked eye.

Just prior to the fertilisation of the wheat flower, the feathery stigmas begin to expand, the stalks carrying the anthers or pollen sacs begin to lengthen and the pollen sacs themselves swell owing to the ripening of the pollen. This process continues until the pollen sacs are right above the feathery stigmas, when they burst, scattering countless pollen grains on to the fully-expanded stigmas. At about this time two small organs, more or less wedge-

shaped, situated at the base of the flowers, and known as lodicules, begin to grow, and in their growth force open the two flowering glumes, so allowing

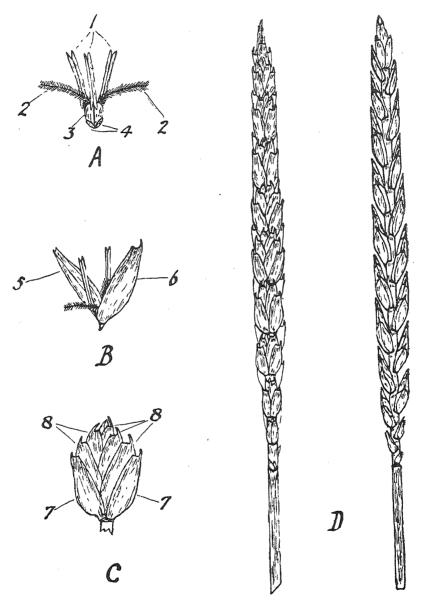


Fig. I.—A, Essential organs of the wheat flower—1. Anthers or pollen sacs: the male organs. 2. Stigmas. 3. Ovary, which with the stigmas constitute the female organs. 4. L dicules. B, Floret of wheat—5. Inner flowering glume. 6. Outer flowering glume. These two glumes enclose the organs shown at A. C, Spikelet of wheat—7. Outer glumes of the spikelet. 8. Florets. D, Wheat head shown broadside and edge on.

the still growing stalks of the pollen sacs to force the now nearly empty pollen sacs out of the flower. It is these that we see hanging to the sides of the wheat heads when we speak of them as being in flower. The expansion and spreading of the feathery stigmas takes place some time before the pollen sacs are fit to burst; indeed, under some weather conditions, they may be fit to take the pollen two or three days before the pollen of the same flower is ripe. The flowers of the central spikelets practically always open first, then those next in order towards each end, the base florets being always last.

The flowering glumes fitting so close together, and the pollen sacs bursting inside of them before they have commenced to open, ensures self-fertilisation; and other than some malformation of one of these flowering glumes, which is very occasionally seen as a lop-sided or short inner flowering glume, or an injury by an insect such as the boring of a hole in one of these glumes, for instance, natural cross-fertilisation can hardly take place.

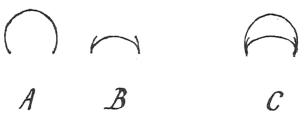


Fig. II.—Showing how the two flowering glumes fit together— A. Cross section of outer flowering glume. B. Cross section of inner flowering glume. C. Cross section of the two glumes when the floret is closed.

ARTIFICIAL CROSS-FERTILISATION.

It has been shown that for a flower to be fertilised ripe pollen must fall on the stigma of the flower when it is in a fit state to receive that pollen, and artificial cross-fertilisation consists in seeing to it that no pollen from the same plant or from the same variety falls on the stigma of any particular flower, and that the pollen from a different variety does fall on that stigma.

CROSS-FERTILISATION OF WHEATS.

The crossing of wheats is rendered comparatively easy by reason of the fact, already referred to, that the stigmas of the flowers are fit to receive the pollen some little time before the pollen of the same flower is ripe enough to fall. In a nutshell, the operation consists in emasculating the flowers, *i.e.*, removing the male organs on a picked head of wheat of the variety chosen as the female parent, when the stigmas of the flowers of that head are mature enough to be fertilised, and placing on the stigmas of the emasculated flowers ripe pollen from the plant chosen for the male parent.

THE SUPPLY OF RIPE POLLEN.

The supplying of this ripe pollen needs consideration some time before one is about to do the operation of crossing, otherwise rather serious difficulties are likely to arise. It is a matter of the most elementary knowledge that the various varieties of wheats mature at different times and also flower at different times, so that if one has decided on crossing a late and an early wheat for instance, some provision must be made for the supply of ripe pollen from the proposed male parent. The simplest way of crossing wheats is to supply the pollen directly from the male parent head, so that where one decides to cross late and early wheats they should be sown so that they flower at about the same time, i.e., the "late" wheat sown early and the "early" wheat sown late. Failing this one is handicapped, but by no means prevented, from making the desired cross, because ripe pollen can be collected and stored for some fair length of time without dying. By this method one can utilise the late wheat as the female parent and the early one as the male parent by collecting the pollen from the early wheat when it flowers and storing it until the late one has matured sufficiently for the operation. The collection of pollen is done with a pair of forceps as follows: -As stated above, the central spikelets usually flower first, then in order towards the top and bottom; but it must be remembered that the process does not take long; given favorable weather conditions it is a matter of minutes only for the majority of the flowers on a head to mature, with the upper and lower, particularly the lower ones, some time behind the others. When the pollen sacs (anthers) are pushed out of the enveloping glumes of the central spikelets of a suitable head, with a pair of forceps open the flowers nearest the ones that have expelled the pollen sacs, and if the anthers in them have just burst or are on the point of bursting, pinch them off with the forceps and drop them into a bottle. The expelled anthers may also be collected provided it is done as soon as they are pushed out, for at that time they still contain a fair amount of pollen; but they are just as well left alone if they have been exposed to the wind for any length of time. The bottle, or whatever receptacle is used for the storing of ripe pollen, must be perfectly dry and free from any disinfectant. When enough pollen has been collected for the purpose it must be spread out to dry in a room free from draughts and free from disinfectants; when dry it should be put in a dry bottle and corked or plugged with cotton wool until required. This pollen can be put on the stigmas with a brush or else in exactly the same manner as the method to be described for using pollen directly from the male plants.

NECESSARY APPLIANCES.

There are practically no instruments absolutely necessary for the work of cross-fertilising wheats; all that can possibly be used to advantage are a pair of small easy working forceps, a pair of small scissors, a ball of darning

wool, and a small bottle containing absolute alcohol or at least strong spirits. The whole of the work could be done with a hairpin or a piece of bent wire. A stool or at least a box is very useful, as the work can be done much more quickly, mainly because the stalk carrying the head that is being fertilised can be held between the knees and the remaining heads of the plant kept away from interfering with the work.

POLLEN FROM THE MALE PARENT.

Where the varieties proposed as parents for crossing have been sown so that they flower at about the same time, the simplest plan is to take the pollen directly from the heads to be used as the male parent, and put it straight into the flowers to be crossed. For this purpose only the best heads from the best plants procurable should be used. After having chosen suitable plants any of the good heads thereon that have just commenced to flower, *i.e.*, those of which only the central spikelets have started to expel pollen sacs, can be used as male parents. Two or three of these heads should be picked without handling them any more than can be helped, and be carefully wrapped in a piece of cloth or put in a small box, until the head to be used as the female parent is chosen.

SELECTION OF HEAD OF FEMALE PARENT.

If a number of the flowers of a head of wheat that have none of the pollen sacs already burst, be examined, the feathery stigmas will be found to be in



Fig. III.—Showing the stigmas of the wheat flower -A, When the flower is green. B, When the stigmas are fit to take pollen.

two stages—(1) in those still very green they are constricted, more or less stuck together, and in a vertical position; and (2) in those approaching maturity they are to be seen spread to their fullest in opposite directions, and lying practically horizontally.

Any head having the bulk of its flowers with the stigmas spread to their fullest in a horizontal position as shown in Fig. III., and the pollen sacs beginning to take on a yellow color, is in a fit state to receive pollen, and so suitable as a female parent for cross-fe tilising. But before looking at the flowers, a choice of plants should be made, and in this connection only the best plants procurable should be used. Of these best plants, only the best

heads should be used. A suitable femalehead can be recognised quickly by holding the top of the head in one hand to keep it stiff and firm, and then with the forceps catching hold of the top of the outer flowering glume firmly, pressing downwards on it and pulling a little outwards at the same time. This will open the flower sufficiently to expose the anthers and stigmas. This should be done to at least one floret on each of the four central spikelets on each side of the head, and if the stigmas of these are spread horizontally, and the pollen sacs are beginning to go yellow in color, that head is suitable for immediate operation as a female parent head. Only the outside flower in each spikelet should be looked at in this way, and, indeed, only those on the right hand side of the head as one faces it. This is done because one must perform the operation quickly, for the handling of a head that is near to its flowering point hurries on this flowering, which renders a head useless as a female parent. The right hand outside florets of the spikelets are the easiest for a right-handed person to open in this manner. Also, as we shall see later, it is not desirable to fertilise those particular florets, so no harm is done if in the hurry they become damaged.

METHOD OF PROCEDURE.

Having found a head in a fit state to be fertilised, the operator should sit down so that the head is broadside on, and close enough to it that he can hold

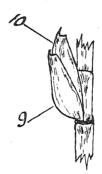


Fig. IV.—Showing the single flower of the spikelet left to cross-fertilise. 9. Outer glume of the spikelet. 10. Floret.

the stalk carrying the head between his knees, keeping all other stalks of that plant on either side of the legs. If this is not done the other heads are continually crossing the line of vision, and every time the head being operated on is let go it has to be found amongst the others. As the central spikelets are, as a rule, the only ones fit to be fertilised, it is usually a waste of time doing the others; in any case the central spikelets produce the largest grains, and it has been proved a number of times that the largest grains produce the biggest crops, and also a bigger proportion of large grains in the resulting crop. This being so, one will only use five or six spikelets on each side of the

head, and by only using this number two or three spikelets above and below these useful ones on each side of the head need to be wholly removed.

Operations are commenced by holding the top of the head in one hand, and with the forceps removing the bottom two or three spikelets that are not to be fertilised by catching hold of the whole of the spikelet and pulling it abruptly downwards, removing each with one pull if possible. Still holding the top of the head to keep it firm, to give something to pull against and to reduce to a minimum the handling of the florets to be fertilised, remove all of the next spikelet except the floret on the extreme left of it. This should be done in one operation by firmly catching hold of all of the spikelet that is to be removed with the forceps and then pulling it sharply to the right; this leaves the single floret as shown in Fig. IV.

The inner flowering glume is now facing the operator, and this must be carefully opened so that the flower can be emasculated. Do this by gripping the outer edge of this glume, i.e., the edge nearest, and carefully open it from the outer flowering glume by making the edge that is being held pass through about a quarter of a circle; really it is pulled a little to the right and then in towards the central stalk of the head. This method of opening the glumes is, to my mind, absolutely necessary to ensure first class results, and is really one of the most important points connected with the work, for the least little too much pull directly away from the other glumes, or, for that matter any carelessness at this stage, will upset the whole of the work, and this without any apparent reason. What happens, more particularly with some varieties than with others, is that the ovary is shifted from its position, and it usually drops back into its correct position without being noticed, because all of the operator's attention is fixed on the anthers.

When the glumes are opened in this manner it is easy to see the three anthers that are to be removed, and this should be done quickly, as the handling of that floret and the opening of it to the sunlight hastens its flowering, and they must be displaced before this happens, otherwise the work on that particular spikelet goes for nothing. The removal of these anthers is done by catching hold of them very lightly with the forceps, being very careful not to rupture them, and pulling straight upwards; the very lightest pull will displace them, so there is no need to grip them at all firmly. At times the three of them can be got at once, but this is of little importance provided that time is not wasted in the operation of getting them out singly. That particular floret is now emasculated and ready to receive the pollen from another flower.

Now unwrap the heads to be used as the male parent, and with the forceps begin by opening the flowers nearest to those that have expelled the pollen sacs. In favorable weather probably these will be found to have just burst their pollen sacs, or to be on the point of doing so. When they are very near to bursting they have a very full appearance, whereas until they reach this

bursting stage the tops of the anthers are constricted and pointed. When nearly bursting they are spread apart and rounded. If anthers that have just burst can be found, or for that matter any that have just been expelled from the flower, take one of them and put it in the emasculated flower, upside down, so that the apex comes in contact with the feathery stigma; then close up the flower by making the inner flowering glume go through an exactly opposite movement to that used in opening it. This flower is now completed. If no anthers that have just burst can be found, but some are present that look to be near it, extract one of these and test it by gently pressing the apex of it on to one of the finger nails; if fit for use this pressing will burst it, and it will leave a small heap of yellowish powder-like substance (pollen grains) on the nail. Put this in the prepared flower apex downwards and close as described. If no anthers in either of the above stages can be found at the first hurried examination close the floret that has been operated on,

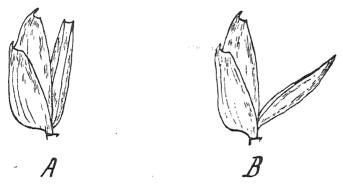


Fig. V.—Showing how to open the wheat floret to emasculate it—A, Correct method.

B, Easiest, but incorrect, way.

and with the scissors cut off the tops of the flowering glumes of one of the male parent heads so as to admit air, warmth, and light, or what is perhaps quicker, pull off one glume of each of the outside flowers with the forceps. This exposure hurries on the ripening of the anthers, and if the weather conditions are favorable, before one has wholly treated one head in this manner, some of the anthers will have ripened sufficiently to use for fertilising the flower. As soon as one has discovered a fit anther, reopen the emasculated floret and fertilise as described.

Exactly similar proceedings are gone through with the next spikelet above the one already completed, and so on until the five or six florets on the one side of the head are finished. Shift the seat to the opposite side of the plant, and repeat the operations on the second side of the head, wholly removing the bottom two or three spikelets, and fertilising the left-hand outside florets of five or six spikelets, taking them in their order. When the 10 or 12 flowers

have been fertilised, those still above them are nipped off with the scissors, stalk and all. If the female parent is a bearded wheat it pays to cut the beards from the flowers to be fertilised, as they are then easier to get at, and there is nothing to interfere with whatever is used as a protector for the head.

The fertilisation of the head being now completed it only remains to protect it from the birds, insects, &c., and to keep properly closed the flowers that have been operated on, at all events until the grain begins to develop.

It is often recommended to emasculate all the flowers that are to be fertilised a day or so before one wishes to put in the strange pollen, of course adequately protecting the head in the meantime; but this will be found unnecessary so long as no attempt to bring about a cross is made before the feathery stigma is well spread out, and so long as the head to be used as the female parent is not left until it is very close to the bursting of the pollen sacs. This emasculating the florets some time before fertilising not only doubles the handling of the female head, but the second handling is more awkward, as the top of the head has been removed, and it leaves nothing by which to hold to keep the head stiff and firm without pressing on the flowers already fertilised, so tending to open them after they have been carefully closed. If one emasculates all the flowers on one side of a head, even though it be at the time one intends doing the complete operation, complications arise which are non-existent when the florets are taken in their regular order. It is so easy to forget which flower was last fertilised, particularly if there is any trouble to get ripe anthers, with the result that one keeps on opening flowers that have been already fertilised. Every time a floret is opened it becomes increasingly difficult to close the glumes together, or at all events to keep them closed, and naturally the more often the florets are opened the greater the chances of injuring the ovary.

Again, many writers on this subject advocate the fertilising of two flowers—the two outside ones—of each spikelet in the central zone of the head; but unless one is short of female heads I would personally never recommend it. The increased number of flowers to be fertilised in the one head makes the risk of some of them flowering while operating very much greater. More important still, the left-hand outside flower is very easy to operate on because it faces toward the operator; but the opposite or right outside flower is a back-handed job, and as such one in which it is very easy to injure the ovary, with very little chance of seeing what has happened. Here also it is so easy to forget which was the last flower fertilised, and so much extra handling of the florets is the result. If the number of female parent heads is not limited, a right-handed man will easily do more than two heads, utilising only the left outside florets of each spikelet, in the same time that it would take him to do one head operating on both outside florets.

PROTECTING THE FERT:LISED HEAD.

Many methods of protecting the heads are used by different breeders, such as oiled paper, waxed paper, gauze bags, &c., but a very simple method, and one that has proved quite effective, is to completely envelope the whole head with ordinary darning wool by winding it on the double, closely but not too firmly, round and round the head from top to bottom. This keeps

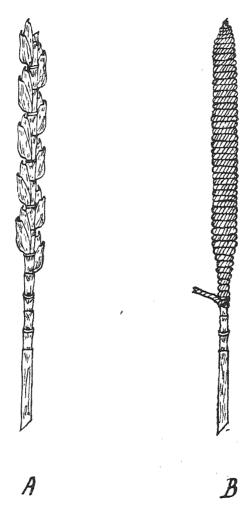


Fig. VI.—Showing the cross-fertilised head—A, Unprotected. B, Enveloped in wool.

the florets absolutely closed, preserves the head from insects and birds, and, if black or any bright color, it is easily seen in a field; it is so elastic that it does not retard the proper development of the grain.

A small label should be tied to the stalk carrying the fertilised head stating female and male parent, and anything else of interest, such as date, number of flowers fertilised, &c., that one may wish recorded.

USE OF ALCOHOL IN CROSS-FERTILISING.

A small bottle of alcohol is necessary to sterilise whatever instruments one may be using. For instance, after one has completed one head the forceps have naturally collected a good deal of pollen, and before touching a head of any other variety that one intends using as a male parent, these pollen grains must be killed. This is done by dipping the forceps into the alcohol-methylated spirits is the cheapest form that is suitable-which kills the pollen, and has the great advantage of drying very quickly on exposure to the atmosphere. Sometimes the handling of the female head sets some of the florets flowering before the head is completed, and to prevent the pollen dropping into the florets already artificially fertilised, the offending floretglumes and all-must be quickly and carefully pulled off. This often means pollen grains hanging to the forceps, and to prevent fertilising the florets with pollen from the same head the forceps must be again sterilised. Indeed, whenever there is any chance that any of the instruments have on them pollen different from that of the male head, they should be sterilised; and this should be done at least after every head is completed.

TIME OF THE DAY TO OPERATE.

The operation of cross-fertilising wheats can be done at any time of the day if heads that are flowering can be found for the male parents, but the ease with which it can be performed depends very largely on the time of the day that it is carried out. For successful results, the quicker each head is completed the better; and for pace, it is necessary to have a plentiful supply of ripe pollen sacs. If this provision is not made much time is lost in hunting for them in the heads being used as male parents. To get this plentiful supply of ripe pollen sacs readily, it is necessary that the flowers should be maturing quickly. This depends to a great extent on weather conditions, so much so that given favorable conditions the majority of the flowers in a head may mature in one day, whereas with unfavorable weather it may take that same head three or four days. Favorable weather for rapid flowering appears to be direct sunlight that is not too hot; and unfavorable conditions, a cloudy sky with cold moist winds. As these suitable conditions are usually present at heading time in the morning, that is the best time to undertake crossfertilisation. In practice this is very noticeable, for in a suitable morning an operator can do up to three heads in an hour, but during the afternoon of the same day the same person would be lucky to do half that quantity.

SUMMARY OF THE WORK OF THE CROSS-FERTILISATION OF THE WHEAT PLANT.

- 1. The appliances that can be useful in this work are a pair of light forceps, a small pair of scissors, a ball of darning wool, and a small bottle of alcohol.
- 2. The head to be used as the male parent should just have commenced to expel pollen sacs when picked.
- 3. The head to be used as the female parent should have the feathery stigmas in most of the outside florets of the spikelets spread to their fullest, so that each one lies practically horizontally.
- 4. Wholly remove the bottom two or, perhaps, three spikelets on one side of the head, because they are rarely fit to take pollen as soon as the central ones.
- 5. From the lowest spikelet that is far enough advanced to be fertilised, remove all the florets except the outside one on the left side.
- 6. Open the floret by catching hold of the outside edge of the inner glume and pulling it towards the central stalk of the head, being careful not to pull it too far out of the outer glume before turning it towards the centre of the head.
 - 7. Remove the pollen sacs, making sure that three are taken away.
- 8. Put a burst pollen sac into the open emasculated floret so that it is upside down and has the apex touching the stigmas.
 - 9. Carefully close the floret with the reverse action to that of opening it.
- 10. Repeat the operations given in Nos. 5, 6, 7, 8, and 9 for all spikelets with florets mature enough to take pollen.
 - 11. With scissors nip off the top part of the head that was not cross-fertilised.
- 12. Envelope the head in darning wool by winding it round and round from top to bottom.
 - 13. Tie a label to the stalk carrying the head stating what the cross is.
- 14. When the head is completed sterilise the forceps before attempting another head. Sterilise any instrument that comes in contact with pollen other than that of the male parent.
 - 15. The best time of the day to operate is during the morning.

(To be continued.)

CASTRATION OF COLTS.

By F. E. Place, B.V.Sc., M.R.C.V.S.

The age at which the operation is performed is, in the writer's opinion, immaterial as regards the after development. The risk is also practically the same at any colt age. The more fully the testicles are developed the more easy it is from the standpoint of the operator. The health of the colt is important. When the animal is weak from worms, strangles, and so forth, the operation is better deferred. The handling of the colt should be undertaken some weeks before operating, to avoid chasing and heating the animal at the time; as a matter of fact, the more handling a colt gets the better it is for him. Fasting overnight is advisable, to avoid over-distension of the bowels or stomach during the operation.

Control of the colt resolves itself into the standing or lying position, with variations of the latter. The standing position, in the writer's opinion, after many years' experience of it, has no advantage to offer over the recumbent. The colt is strongly haltered, backed into a corner, near side to the wall, and a twitch put on its nose or ear. The man at the head keeps it a little to the off in order to keep the colt against the wall; a second assistant keeps the animal's rump up, and holds the instruments. With or without anesthetic the operator grasps the cord and proceeds with the operation in the ordinary way. It is best, however, to extract both testicles and sever the cords before removing either.

THROWING THE COLT.

The practice of putting down the colt is carried out in several ways. The most general are the single sideline or the double sideline. Operators have their own variations of both. The hippo lassoo is used by some men, and is a leather gear which draws the limbs together above the knees and hocks and controls their movement. A single sideline method is to take about off in hemp rope, put a bowline round the off shoulder of the hale weed colt, bring the line over the lack, round the near hind fetlock through the bowline. The off fore may be tied up. The halter is brought take through the fowline on the near side, and the caster, standing off the off side well up to the shoulder, presses with his left elbow on the colf side well up to the head round to the shoulder and the hind leg up. The colt comes down on his off side, and the head and heel rope are tied in bows to the bow-

line, keeping the colt under control. If the operator cannot work with the colt on the off side, reverse the method and he comes down on the near.

A double sideline method is to take the centre of a 40ft, rope, make a loop by bringing the double through the bight, then bring the double again through this loop, thus making a slipknot on a double bight. This can be as large as one likes to slip over the head, and can be drawn tight enough to choke the beast if desired, as it does not jamb and can be slacked off at once. The knot is adjusted on the breast: the slack coiled is taken to the hock outside inward, and brought over itself and through the (double) breast collar. It is best to do this on both sides at once. It will be seen that the more strain there is on the leg ropes the greater the improbability of the collar drawing tight, although still a slipknot. The men on the sidelines being ready, the lines are dropped to the heels. The man at the head backs the colt, the slack of the side lines is taken up by the side men pulling back and towards the near side, if he is going down on that, the colt sits down. and rolls over.

Three variations now follow:—First, the off hind is drawn up to the shoulder and a clove hitch put on its pastern, and the operation proceeded with. Second—The same as the last, but the near hind is also drawn up and the slack of the two side lines twisted together. Third—After making the near hind fast, a clove hitch is put on the near fore, the animal rolled over, and the same procedure as with the off; the animal is kept on his back. With all of them the man at the head has a big advantage if he keeps the nose off the ground, and so prevents the animal getting a purchase with it.

A thin line used as a crupper and brought to the head prevents the arching of the back and the straining that is so detrimental. About 15ft. of ploughline doubled for the crupper and twisted along the back serves well for this. It can be made fast to the forelock or halter. The writer prefers to operate without preparation of the parts, as the natural oily secretion is a great anti-microbe protection; but if they are very dirty the sheath and penis may be washed and anointed with carbolic oil or lard, but the time taken over this involves keeping the colt down longer than is really necessary. The method of operating is usually either with the hot iron, emasculator, or ecraseur. Tying the artery and the use of clamps may be looked on as emergency methods only. The ecraseur, or crushing chain, is too costly for general use. The writer prefers the emasculator, as being handier to use than the iron, which, of course, is quite aseptic.

THE PROCEDURE.

The procedure is to grasp the smaller or lower testicle firmly, so that the scrotal skin is stretched over it. Cut boldly through it, through the inner membrane, right on to the testicle, no harm happening if this is also cut. The cut through the skin and membrane should be large—the whole length of the gland—as they are stretched, and it is really much smaller. It should be forward in order to allow free drainage. The testicle, being exposed, should not be allowed to slip, the clamp used with the iron being advantageous for this, and if preferred may be used with the emasculator, but is not necessary. The hand holding the testicle should be kept well in the crutch, as the colt may then struggle without any strain on the cord, which is fibrous at the back of the gland, and may be cut through, and so the gland prevented from being drawn up. If cut close to the testicle, the pride or epididymis is left, and the colt cut proud; it is better to cut above the pride and cut clean.

The emasculator is then applied to the artery in front of the cord and lightly closed. The vessel may be twisted three times to ensure a more complete crushing. The instrument, kept well in the crutch, is closed tightly and kept there for half a minute or so, then opened slowly to avoid escape of the artery if not sufficiently crushed. When the emasculator is off, the purse should be well pulled so that the cord may slip away from it and not stick, and the colt released. As he will be stiff, it is well to let him take his own time in rising.

Dressing for the seat of operation may be any antiseptic. Plain lard is as good as most; carbolic oil is liked by many, and spirit of iodine is spoken well of.

ACCIDENT.

Accidents that may occur are rupture with escape of the bowel, appearance of the apron or mesentery through the cut, and straining of the back through struggling or pulling on the cord; bleeding; later, thickened cord, excessive swelling. For rupture, clean and return the bowel, sew up the inner membrane and skin. Cut off the mesentery, Keep the hand well in the crutch and the backline tight to prevent strain. A broken limb cannot happen if the back is not allowed to arch. Swelling is reduced by hot fomentations with soda or other mild antiseptic. Thickened or schirrous cord requires a second operation later if iodide of potassium internally does not reduce it. Windstones or waterstones are thickenings due to insufficient drainage, and will not occur where the cut in the purse is large. Bleeding happens through insufficient searing or crushing, and may be stopped by cold water over the loins, packing the purse with cotton wool soaked in

tincture of perchloride of iron, or if very severe it may be necessary to take up the artery again, and re-treat it. Sometimes bleeding is internal from a damaged vessel, and cannot be satisfactorily dealt with.

ANÆSTHETICS.

Anæsthetics may be given to facilitate control, but the writer prefers to operate without, as their after-effects are often more inconvenient to the colt than the operation, which, once the skin is cut, is not really painful.

They are local and general, and are used alike for the standing or cast operation. A common local one is an injection into the scrotal sac of a solution of cocaine, 20 to 30 drops of a 5 per cent. strength being used, but half to one grain may be used with advantage. At least five minutes should clapse between injecting and operating.

Morphia is used sometimes instead, or urea and quinine. The technique of all these requires trained operators.

Chloroform is the common general anasthetic. If given when the animal is standing, it is controlled by two long leading reins. Three ounces of the drug are put into a chloroform muzzle or closed nosebag, and the animal is allowed to wander round and round till he falls gently to the ground asleep. This quantity will sufficiently dull feeling to allow the operation to be proceeded with if the legs are secured. If it is desired to completely deprive him of feeling, additional half-ounce doses must be added till the tail is quite limp and the eye does not respond to a touch; but to go this far a trained anæsthetist is desirable. Chloroform may be given more accurately if the animal is cast first, then 3oz. or 4ozs. given in a chloroform muzzle or closed nosebag or on a towel covered by a branbag. It is well to grease the nostril to prevent the drug scalding it.

If the pulse weakens or the breathing fails, dash cold water on the colt and allow plenty of air, with ammonia to the nose. Chloral hydrate will prove more satisfactory to the amateur, as under chloroform there is a struggling stage and reflex struggles, but an ounce of chloral may be given to a colt, and it will keep him asleep for hours. Half an ounce will, as a rule, be sufficient. It may be dissolved in a pint of warm water and given as a drench or wrapped in paper and given as a ball, or best, dissolved in gruel and given as a rectal injection an hour or two before operating. It will produce sufficient loss of consciousness to entirely prevent dangerous struggles. But rather than resort to anæsthetics, however, the writer would recommend the employment of a careful, quick operator,

A NEW WEED.

By George Quinn, Horticultural Instructor, and H. W. Andrew,
Botanical Assistant.

In some notes published in last month's issue of this Journal it was pointed out that one of the chief means of disseminating weeds was by way of sowing impure agricultural seeds. Doubtless the majority of our weeds have been introduced into the country with infested agricultural seeds, feeding stuffs, poultry food, &c. On the other hand it is recognised that hay, straw, litter, and packing material are sometimes responsible for their introduction. Although power is conferred under the Federal Quarantine Act to seize such goods containing any noxious weed, or part thereof, there always remains the possibility of weeds being admitted in this manner. A somewhat unusual but rather striking instance of the way in which weeds thus follow in the wake of commerce came under the notice of this Department some time ago. A consignment of fancy goods contained an ingenious advertisement in the shape of a tag attached to the weedy hooked flower heads of the noxious burr Arctium Lappa (L.) "Bur-On being thrown at a person the burr would attach itself readily—together with its advertisement—to the clothing, the individual becoming converted into a walking advertisement. The consignment was summarily dealt with under the Federal Quarantine Act, and as a consequence this weed still remains a stranger to the State.

On the 12th August last a specimen of a plant belonging to the cabbage or mustard family (Cruciferac) was submitted to this Department for identification. On examination it was found to be Carrichtera annua (L.) Prantl, which has not previously been recorded as found growing in Australia. A second specimen of the same plant was also brought in by another resident of the same district. Both men expressed the opinion that the plant must have originated from packing material dumped down on the side of the Three Chain Road leading to Butler's Bridge, about four miles from Port Pirie, where the plant now extends over 100 to 200 acres of land; and, further, the plant was not noticeable more than a couple of years ago. It would appear, therefore, that it has spread very rapidly, though apparently very limited in its distribution at present.

This plant, if not exterminated in the near future, is likely to become very widespread. The specimens submitted are much branched, 2ft. in height, and each bears several hundred pods, each pod normally containing eight seeds.

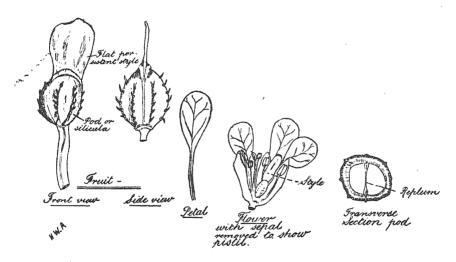
Notwithstanding the fact that the cabbage family of plants is one of the most useful, it contains a large number of weeds which give



much trouble to the farmer, such as "Charlock," Brassica sinapistrum, Bois (Sinapis arvensis, L.); "Oriental Rocket" or "Indian Hedge Mustard," Sisymbrium orientale (L.), and turnip weed, Rapistrum rugosum (All.). The last mentioned is much in evidence just now, its

prevalence resulting in some discussion in Parliament and the press. These weeds are not only the cause of direct harm to the crops, but many of them are a source of indirect injury in harboring fungus diseases. Sisymbrium orientale, particularly this year, is quite commonly affected with the fungus of the "White rust," Cystopus candidus, while finger-and-toe disease, Plasmodiophora brassicae (Woronin), also attacks nearly all kinds of wild and cultivated members of this family.

No available literature can be found at present dealing with the value of *Carrichtera annua*, but owing to its fibrous, woody nature, and small, finely divided leaves, it is not likely that it will prove a fodder of any value. Moreover, coming from the Mediterranean region, which has given us most of our worst weeds, and on account



of its prolific seeding habit, it is more likely to prove a source of considerable trouble and expense to the agricultural community. Professor Ewart, Government Botanist of Victoria, in his book on weeds, goes so far as to say, in speaking of *Brassica sinapistrum*, that, "As in the case of all wild *cruciferae*, it has no value as a pasture plant, and even cabbage, rape, and turnip, when allowed to run wild, lose their food value and become unpalatable."

[In this connection, the Director of Agriculture, Professor Arthur J. Perkins, says:—"Notwithstanding the opinion of the Victorian Government Botanist, in my experience sheep graze readily on most of the local cruciferous weeds, charlock, mustards, rockets, &c., and land heavily stocked with sheep can in the course of time be freed of most of these weeds.—Ed.]

There is no power under the Federal Quarantine Act to follow up any case such as this; when once introduced and established the Federal authorities have no control.

Any steps to eradicate or restrict this weed must therefore be taken by the local authorities, local governing body (district council or corporation), or private individuals on whose land it may be found growing.

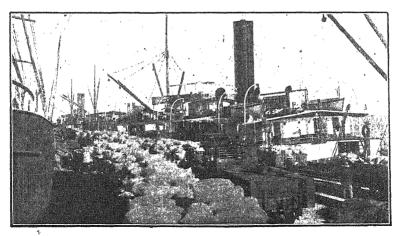
This certainly appears to be a case where the responsible authorities could step in early without incurring much expense, and exterminate a weed which threatens to vie in noxious characters with some of the worst weeds introduced from the Mediterranean region. Such action may save farmers endless trouble, and, in any case, the country would be freed of a plant which, as far as can be gathered, has no economic value.

BOTANICAL DESCRIPTION.

Carrichlera annua (L.), Prantl.—Erect, much-branched annual, with stiff hairs. Branches rigid and woody at base. Leaves stalked and finely divided, almost bi-pinnate.

Flowers: Small, in long racemes, on stalks or peduncles (recurved in fruit), nearly as long as the sepals; sepals erect, 3mm. long, green to brown or purplish; petals, 6mm. long, pale yellow, with purple veins and long claw.

Fruit: Pod or silicula about 5mm. long and egg shaped, mounted by broad, flat, persistent, and green style about 4mm. long. Pod consisting of two cells or loculi, with four seeds in each cell. Exclusively Mediterranean region.



Shipping Wheat, Wallaroo.

TESTING MILK AND ITS PRODUCTS.

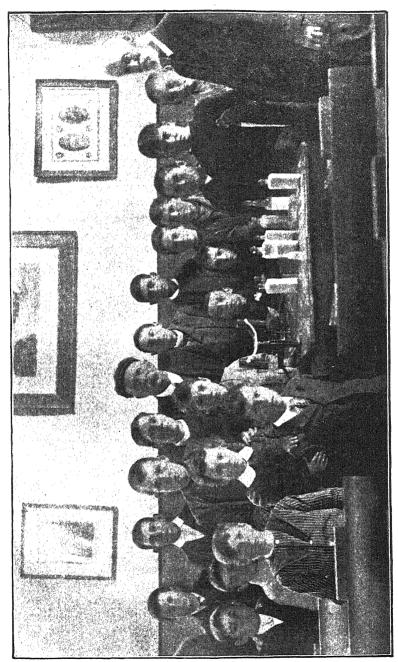
The officers of the Department of Agriculture have lost few opportunities of impressing on dairymen the importance of systematically testing the product from their cows; and from time to time the Dairy Expert and his assistant have instructed school children in the use of the Babcock tester for the purpose of ascertaining the butter fat content of milk and cream.

The Headmaster of the Wallaroo State School (Mr. Bray) has hit upon a happy idea in furthering this work, and at the same time interesting the "young idea" in agricultural pursuits.

Having instructed a class of boys in the principles of the use of the Babcock machine, he has undertaken, with their aid, to test samples supplied by local dairymen. These have not been slow to take advantage of the offer, and there is every reason to anticipate that this will tend to improve the dairy stock kept in the district.

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of October, 1915, 1,400bush. of fresh fruits, 12,944bush. of bananas, 15,848 bags of potatoes, 969 bags of onions, 130 packages of vegetables, and 30 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 103bush. of bananas (over ripe) were destroyed. Under the Federal Commerce Act 1,405 cases of fresh fruits, 208 packages of dried fruits, 12 packages preserved fruits, and 1 package of seeds were exported to oversea markets during the same period. These were distributed as follows:—For London, 203 packages dried fruits; for New Zealand, 1,405 cases citrus fruit; for India and East, 5 packages dried fruits and 12 packages preserved fruit; for Italy, 1 package of seeds. Under the Federal Quarantine Act 1,254 packages of seeds, plants, and bulbs, &c., were examined and admitted from oversea markets.



Testing Samples of Milk at the Wallaroo State School.

ADVISORY BOARD OF AGRICULTURE.

At the invitation of the Principal, the Advisory Board of Agriculture met at the Roseworthy Agricultural College on Thursday, October 14th, when there were present Mr. F. Coleman (Chairman), Professor Perkins, Messrs. W. J. Colebatch (Principal Roseworthy Agricultural College), C. E. Birks, A. M. Dawkins, C. J. Tuckwell, and H. J. Finnis (Assistant Secretary). Apologies for non-attendance were received from Messrs. J. Miller, T. H. Williams, and W. G. Auld.

During the morning the members drove round the College farm, and inspected the crops, the general condition of which was favorably commented on.

SALE OF HARVEST MACHINERY PARTS.

The Assistant Secretary reported that, in accordance with the wishes of the Board, the Chief Inspector of Factories had issued a supplementary circular to inspectors in country shopping districts, giving instructions that no objection should be taken to the supply of parts of machinery or other necessary equipment bona fide and urgently required by farmers from shopkeepers during the harvest months.

FOREST TREES FOR MEMBERS OF THE BUREAU.

It was stated that the Conservator of Forests had reported that it was customary, in cases where requests for forest trees were received from branches of the Agricultural Bureau, to issue an order for the total number of trees that could be supplied, on condition that a list was furnished showing the name of each applicant and the kinds and numbers of trees each desired to obtain.

RAILWAY RATES AND RESTOCKING.

A resolution from the Warcowie Branch of the Bureau requested that, in view of the peculiar circumstances created by the losses of livestock through the drought and the necessity for restocking the land as quickly as possible, steps might be taken to secure reduced railway rates for Far Northern farmers in connection with the carriage of breeding animals, particularly bulls and stallions. On the motion of Professor Perkins, seconded by Mr. Tuckwell, the Board determined to refer the matter to the Minister of Agriculture, with a recommendation that it should receive favorable consideration.

WILD TURNIP AS A NOXIOUS WEED.

Communications were received from the Arthurton, Kadina, and Balaklava Branches, drawing attention to the spread of wild turnip. The Acting Secretary, who had lately visited Balaklava. referred to the trouble which the weed was causing in that district. Mr. Colebatch said the weed had been on the College farm for years. but it was only to be found on the roads. It had been worked out of the fields by cultivation and judicious grazing. Mr. Birks said it only grew where land was neglected. Professor Perkins asked whether the Noxious Weeds Act had been instrumental in keeping down noxious weeds. Mr. Coleman said the Saddleworth Council had kept down saffron thistles. After further discussion it was resolved, on the motion of Mr. Dawkins, seconded by Professor Perkins, that until the Noxious Weeds Act was amended—as had been suggested by the Board—it was useless to declare a weed noxious. It was also decided that members should study the present legislation and discuss it at the next meeting with a view to making suggestions that would make its working more effective.

PRECAUTION AGAINST FIRE.

The Port Broughton, Arthurton, and Maitland Branches called attention to danger from fire in the coming summer on account of the luxuriance of feed, and also to the danger of smoking open pipes near ripe crops and haystacks. On the motion of Mr. Tuckwell, seconded by Mr. Dawkins, it was decided to suggest to the Government that the usual copies of the regulations dealing with these subjects should be widely and prominently distributed this season.

WHEAT CARTNOTES.

A suggestion was received from the Elbow Hill Branch that buyers of wheat should state on the cartnotes the weight of each bag. The proposal did not meet with support.

STORAGE NOTES ON WHEAT.

It was decided to forward the following resolution to the Adelaide Chamber of Commerce:—"To facilitate storage of the coming wheat crop with the merchants, millers, and others, the Advisory Board of Agriculture respectfully suggest that all storage notes handed to the farmers by merchants, millers, and others shall clearly set out all charges to which the storer will be liable in the event of the wheat not being purchased by those with whom it is stored. The Board would also suggest that such notes be transferable, subject to a first claim by the merchant of amount of account due to the firm holding the wheat."

Branch Conferences.

The Goode Branch wrote suggesting that a conference of the far West Coast Branches should be held annually, and thus give settlers the advantage of the attendance of departmental experts. The Acting Secretary explained that there were seven branches to be served, and that a conference could be held at Denial Bay, and in other centres in rotation. Professor Perkins said Eyre Peninsula constituted a most important centre. The request was granted.

The Yeelanna Branch wrote asking that a conference of the Southern Lower Eyre Peninsula Branches be held at Yeelanna in March next, and that departmental experts attend and deliver lectures. Professor Perkins stated that the district was distinct from the other two served with conferences. The proposal was commended and adopted.

DANGER FROM PHYLLOXERA.

A letter was received from the secretary of the Phylloxera Board stating that the question of the possible introduction of vines from Murrayville, in Victoria, into the Pinnaroo district had been discussed by his board, which had decided to approach the police in that part of the country with a view to helping the board. Since then the suggestion had been made that Agricultural Bureau Branches in that portion of the country should have their attention drawn to the danger arising from Victorian vines and fruit trees. The Board decided to advise the branches.

NEW BRANCH.

Approval was given to the formation of a new Branch at Stirling's Well, with the following gentlemen as members:—C., A., S., and E. Bowers, W. Sargeant, W. and E. McGlasson, B. and E. Lauterbach, F. Peake, H. Porter, H. Hilditch, W. Richards, A. and H. Kubank, R. C. Daw, G. S. Ridge, Millard, Kenny, Milte, Robin, and Gowdy.

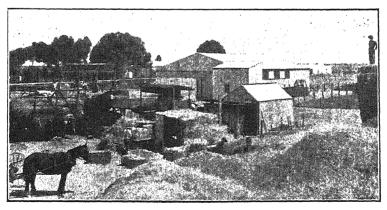
The Loxton South Branch was closed on account of insufficient evidence of effective work.

NEW MEMBERS.

The names of the following gentlemen were added to the rolls of the existing Branches mentioned:—Warcowie—W. J. Sanders, E. Sanders, E. Telfer; Arden Vale and Wyacca—R. Paynter; Hartley—H. Simcock; Saddleworth—A. Jamieson, Thos. Vandeleur; Willowie—I. R. Foulis, F. E. Blight, D. O. Tilbrook, E. C. Foulis, J. H. Schmidt; Mount Remarkable—C. R. Thompson; Green Patch—R. E. G. McDonald; Burra—W. I. Short, W. G. Finch; Naracoorte—M. E. Wardell, Alex. Hutchinson, J. D. Manton, E. Mudge, J. H. Langsford;

Keith-C. B. Godley, F. O. Godley, E. E. Stephens, H. H. Williams, G. H. L. Witmitz; Pinnaroo—A. G. Burge; Colton—J. H. Scarce, H. E. Kalleske; Crystal Brook-H. Wilkin, J. Kirk, H. Frith; Milang-A. G. Dodd, S. Borrett, A. Ross, J. Morcomb, B. Butler; Renmark-D. Constantine, F. Hooper, G. Saies; Belalie North—S. Turner, O. Nugent, H. Cummings, jun.; Berri-B. W. Francis, F. McGlasson, A. W. Rogers, C. G. Souter, A. Samlin; Miltalie-J. F. Crabb; Port Pirie -H. Johns, G. Goode; Wynarka-F. Greig; Clanfield-A. J. Hammett, J. Marshall, W. T. Jeffries, E. A. A. Pavy; Mindarie-L. J. Kelly; Monarto South—A. Harper; Strathalbyn—A. J. Collier; Meadows-H. Champion; Bundaleer Springs-W. H. Jones, E. Jones, J. A. Gerke, N. H. Lawrie; Bute-J. French; Beetaloo Valley-R. Heinrich; Tatiara-W. Carson; Northfield-A. Burg; Mount Remarkable—Chas. Scott; Goode—F. Handtke; Mount Compass—J. L. Bennett; Carrow-J. Kemp; Pinnaroo-M. McIntosh; Glencope-W. G. Retallack, Beckmann.





Baling Straw, Roseworthy,

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Ltd., report on November 1st:-

BUTTER.—Cool weather ruled during October, so that with production maintaining, the market here has, in sympathy with the other States, been influenced by London values, which have receded considerably, and at the close of the mouth "Alfa" is selling at 1s. 2d.; "Primus," 1s. 1½d.; separators and dairies, 1s. 0½d. to 1s. 1d.; store and collectors, 1s. to 1s. 0½d. per lb.

EGGS.—The heavy demand both for local and export has caused prices to advance 2d. per dozen during the mouth, with market closing firm at hen, 1s. 3d. per dozen; duck, 1s. 4d.

CHEESE has had very heavy turnover, East and West buying extensively here. However, values have come back at the end of the month in sympathy with the lowering in butter, present quotations being from 9\frac{1}{2}d. to 10d. per lb.

Bacon.—The high prices ruling have interfered with consumption, and although local factories are only able to forward small parcels, still they are ample for trade wants. Best factory-cured sides, 1s. 4d. to 1s. 5d. per lb.; hams, 1s. 5d. to 1s. 6d. per lb.

Honey.—Small lots of new season's take are being marketed, which are finding brisk sale at 5d. to 5½d. per lb. for prime clear samples. Beeswax very saleable at 1s. 4d. per lb.

ALMONDS.—No alteration to report in this line, Brandis selling at 8d.; mixed soft-shell, 7d.; hardshells, 3d.; kernels, 1s. 4d. per 1b.

LIVE POULTRY.—Supplies of poultry have been very short, so that competition has been lively, and tall rates secured for all offering. A month ago we reported that the outlook for poultry appeared good right up to Christmas, and this still maintains. Good table roosters, 4s. 6d. to 5s. each; nice conditioned cockerels, 4s. to 4s. 6d.; hens, 3s. to 4s.; ducks, 3s. 6d. to 4s.; geese, 5s. 6d. to 6s. 6d.; pigeons, 10½d. each; turkeys; from 1s. 3d. to 1s. 5d. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—In sympathy with the markets of eastern States, potatoes have practically doubled in value during the past month. Victoria has supplied nearly all our requirements, but locally-grown new potatoes are now coming to hand in small quantities. Onions.—Old onions are offering very freely from the South-East and Victoria, and prices are decidedly lower. Quotations:—Potatoes, £15 to £16 per ton of 2,240lbs. on trucks Mile End or Port Adelaide; onions, £5 to £7 per ton of 2,240lbs. on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of October, 1915, also the average precipitation to the end of October, and the average annual rainfall.

	Station.	For Oct., 1915.	To end Oct., 1915.	Av'ge. to end Oct.	Av'ge. Annual Rainfall	Station.	For Oct., 1915.	To end Oct., 1915.	Av'ge. to end Oct.	Av'ge. Annual Rainfall		
FAR NORTH AND UPPER NORTH.						LOWER NORTH—continued.						
	Oodnadatta	0.47	1.78	3.94	4.76	Spalding	1.65		17.87	20.25		
	Tarcoola	0.30	3.32	6.48	7.58	Gulnare	1.36	16.69	17.83	19.74		
	Hergott	0.07	3.11	4.97	6.04	BundaleerW.Wks.	1.29	17.22	15.22	17.29		
	Farina	0.08	3.81	5.62	6.70	Yacka	1.19	13.41	13.71	15.27		
	Leigh's Creek	0.11	3.69	7.32	8.66	Koolunga	1.04	12.70	14.30	15.94		
	Beltana	0.14	5.09	7.77	9.22	Snowtown	1.35	16.22	14.21	15.70		
	Blinman	0.31	6.83	11.16	12.83	Brinkworth	1.26	15.16	13.93	15.48		
	Hookina	0.55	10.04		1 22	Blyth	1.18	15-69	14.75	16.34		
	Hawker	0.52	11.00	10.57	12.22	Clare	1.41	24.53	22.03	24.30		
	Wilson	0.53	9.79	10.34	11.78	Mintaro Central .	1.51	29.38	20.00	21.99		
	Gordon	0.51	8.31	8.97	10.26	Watervale	1.73	27.58	24.66	27.17		
	Quorn	0.78	18.59	12.30	13.78	Auburn	1.71	24.53	21.95	24.25		
	Port Augusta	0.86	8.34	8.26	9.46	Hoyleton	1.20	15.21	16.15	17.96		
	Port Augusta W.	0.86	8.59	8.24	9.36	Balaklava	1.09	14.10	14.31	16.03		
	Bruce	0.54	8.54	8.85	10.01	Port Wakefield	0.74	12.15	11.91	13.13		
	Hammond	0.46	8.73	10.02	11.46	Terowie	0.83	10.19	11.79	13.71		
	Williamia	1.06	17.60	16.38	18.26	Yarcowie	1.29	11.84	12.19	13.91		
	Willowie	0.81	10.39	10.58	23.04	Hallett	0.92	14.71	14.44	16.40		
	Melrose	$\frac{2.07}{1.32}$	22.48 12.17	20·90 14·01	15.83	Mount Bryan	0.80	17.27	14-19	15.73		
	Port Germein	1.31	12.50	11.28	12.84	Burra	1.25	19.88	16.06	17.82		
	Wirrabara	1.93	22.06	17.01	18.91	Farrell's Flat	1.05	19.68	17.09	18.87		
	Appila	1.76	12.39	13.21	15.08			-				
	Cradock	0.86	8.54	9.62	10.86	West of	Murra	Y KAN	FE.			
	Carrieton	0.99	11.53	10.61	12.22	Manoora	1.11	18.81	16.30	18.69		
	Johnburg	0.64	7.58	8.77	10.21	Saddleworth	1.31	21.90	17.65	19.69		
	Eurelia	0.66	10.92	11.56	13.24	Marrabel	1.88	23.30	17.04	18.94		
	Orroroo	0.70	10.20	11.78	13-42	Riverton	1.89	24.35	18.44	20.48		
	Black Rock	0.71	9.70	10.59	12.25	Tarlee	1.53	22.57	15.56	17.48		
	Petersburg	0.85	10.89	11.31	13.07	Stockport	1.20	20.80	14.15	15.89		
	Yongala	1.21	13.48		13.94	Hamley Bridge	1.04	18-20	14.66	16.45		
	8		1			Kapunda	1.68	21.82	17.72	19.67		
]	NORTH-	EAST.			Freeling	1.07	18.05	15.95	17.85		
	Ucolta	0.65	8.23			Greenock	1.44	22.70	19.15	21.46		
	Nackara	0.43	8.67			Truro	1.45	21.23	17.78	19.74		
	Yunta	0.14	3.92	6.94	8.22	Stockwell	1.26	21.30	18.11	20.30		
	Waukaringa	0.24	4.78	6.74	7.94	Nuriootpa	1.35	21.04	19.03	21.25		
	Mannahill	0.20	4.21	7.05	8.46	Angaston	1.40	25.64	19.87	22.25		
	Cockburn	0.43	4.36	6.74	7.97	Tanunda	1.25	22.52	20.04			
	Broken Hill, NSW	0.46	7.52	8.24	9.63	Lyndoch	1-55	24-42	20.81	23.01		
	-					Anm	AIDE P	TATMO				
	m i mi i	WER N		1 1 1 00	1 10 01				11-1-	1.14.00		
	Port Pirie	1.39	12.91		13.21	Mallala	1.23	16.12				
	Port Broughton .	0.99	13.42	12.97	14.33	Roseworthy	1.48 0.91	20.53	15.51 17.29	17.31		
	Bute	1.07	14.76	14.12	15.42	Gawler	0.57	12.54	1	1		
	Laura	1.17	16.16	16.33	18.22	Two Wells	0.69	15.22		1		
	Caltowie	1.18	13.34	15.27	17.27	Virginia	0.83	1	1	t		
	Jamestown ,	1.60	17.54	15·39 14·23	17.46	Smithfield	0.84					
	Gladstone	0.70	14·02 13·46	13.99	16·00 15·62	Salisbury North Adelaide	0.74					
	Crystal Brook	1.12	15.09	16.38	18.32	Adelaide	0.67	18.99				
	Georgetown	0.97	14.56	1		Brighton	0.97	1				
	Redhill	1.39	13.68	15.18	16.79	Glenelg	0.75					
	TWOMIN	1 .35	15 00	10 10	10.19	Civiloig	1 " "	1.00	1.00			
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RAINFALL—continued.

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Station.	For Oct., 1915.	To end Oct., 1915	Av'ge, to end Oct.	Av'ge. Annual Raintall	Station.	For Oct., 1915.	To end Oct., 1915.	Av'ge. to end Oct.	Av'ge. Annual Rainfall	
Adelaide Plains—continued.					West of Spencer's Gulf-continued.					
Magill	1.09	25.17	23.27	25.69	Streaky Bay	0.39	13.56	14.25	15.31	
Glen Osmond	1.39	27.44	22.92	25.26	Port Elliston	0.30	16.69	15.38	16.49	
Mitcham	1.04	26.26	21.39	23.47	Port Lincoln	0.43	19.41	18.44	19.88	
Belair		18.77			Tumby	0.40	12.82	13.72	15.00	
	'	•		'	Carrow	0.48	13.06		-	
Mount	LORTY	RANG	ES.		Cowell	0.32	12.51	10.69	11.76	
				10010	Point Lowly			10.71		
Teatree Gully	1.22	26.71	25.40	28-19	20110 220	1 - 10	1	1 10 11	1	
Stirling West	2.19	53.73	42.76	46.70						
Uraidla	1.92	54.06	40.68	44.35	Yorki	e's Per	NINSULA			
Clarendon	1.40	31.20	30.67	33.67	VIT- II	1 0.05	1 10	1 10 00	11105	
Morphett Vale	0.98	21.41	21.00	23.32	Wallaroo	0.65	12.55	12.83	14.05	
Noarlunga	0.58	20.82	18.51	20.28	Kadina	0.82	14.84	14.62	15.88	
Willunga	0.80	19.32	23.85	25.98	Moonta	0.80	14.08	13.92	15.22	
Aldinga	0.41	17.72	18-47	20.34	Green's Plains	0.84	16.02	14.54	15.73	
Norman ville	0.58	19-33	18.92	20.65	Maitland	0.73	21.18	18.34	20.08	
Yan kalilla	0.61	22.15	20.97	22.78	Ardrossan	0.34	13.43	12.66		
Cape Jervis	0.15	11.04	14.96	16.34	Port Victoria	0.52	15.26	13.84		
Mount Pleasant .	1.21	29.32	24.57	26.87	Curramulka	0.47	18.71	17.04		
Blumberg	1.92	31.65	26.80	29.38	Minlaton	0.63	20.32	15.98		
Gumeracha	1.75	34.22	30.32	33.30	Stansbury	0.70	17.57	15.66		
Lobethal	1.62	39.23	32.56	35.38	Warooka	0.48	17.00	16.44	17-71	
Woodside	1.47	38.75	29.18	31.87	Yorketown	0.37	14.85	16.04	17.47	
Hahndorf	1.23	33.70	32.46	35.45	Edithburgh	0.58	17.09	15.00	16.48	
Nairne	0.97	29.53	26.32	28.83		-	•	•	•	
Mount Barker	1.32	34.76	28.31	30.93						
Echunga	1.30	35.05	30.12	32.83	South A	ND SO	UTH-EA	et.		
Macclesfield	1.01	31.73	27.96	30.72	Cape Borda	0.67	24.64	23.34	25.69	
Meadows	1.72	42.69	32.39	35.52	Kingscote	0.46		17.35		
Strathalbyn	0.47	18.00	17.50	19.28	Penneshaw	0.61	1			
•	•	•	•		Cape Willoughby.	1.09		17.63		
Murray	Rr.Ams	AND VA	T.T.R.W.		Victor Harbor	0.40				
				1	Port Elliot	0.31			1	
Wellington	0.52	12.69	13.29			0.40				
Milang	0.25	10.67	14.57	16.08	Goolwa	0.95	1		1	
Langhorne's Brdg	0.35	10.10	13.53	15.27	Pinnaroo	1.31			10.14	
Tailem Bend	0.43	11.43			Parilla	1.56		1 .	16.55	
Murray Bridge	0.23	9.50	12.65		Lameroo				1	
Callington	0.30	13.35	14.06		Parrakie	1.34				
Mannum	0.23	8.15	10.45		Geranium	1.58				
Palmer	0.52	14.59	13.86		Peake	1.03	1			
Sedan	0.73	11.89	10.66		Cooke's Plains	0.94	1			
Blanchetown	0.54	6.02	9.30		Meningie	0.34				
Eudunda	1.16	18.64	15.42		Coonalpyn	1.25				
Sutherlands	0.61	10.46	9.24		Tintinarra	1.10	1		,	
Morgan	0.42	6.93	7.87		Keith	1.17			10.50	
Overland Corner.	0.63	6.69	9.67	11.42	Bordertown	1.55				
Renmark	9.67	8.09	9.24	10.93	Wolseley	1.87				
Loxton	0.83	9.26			Frances	1.46				
		•			Naracoorte	1.18				
Wrom or	R STATES	ים מימורי	ים דדו		Penola	1.83				
West of				1	Lucindale	1.35		1		
Eucla	0.08	7.44	9.04		Kingston	1.49				
White Well		5.96	8.15		Robe	1.05				
Fowler's Bay	0.52	12.71	11.25		Beachport	1.90				
Penong	0.20	12.52	10.77	11.93	Millicent	2.52				
Murat Bay	0.35	8.57			Mount Gambier .	2.33		28.41		
Smoky Bay	0.37	9.76			C. Nrthumberland	2.29	26.67	24.01	26.63	
		1				1		1	1	
		mercia i restauran	• 10 11 11	1 1 10 10						

THE AGRICULTURAL BUREAU.

CONFERENCE OF HILLS BRANCHES.

The Annual Conference of the Hills Branches of the Agricultural Bureau, which was held at Clarendon on the 21st October, was attended by Mr. Geo. Laffer, M.P., Messrs. Geo. Quinn (Horticultural Instructor), and F. E. Place, B.V.Sc., M.R.C.V.S. (Government Veterinary Lecturer), and the following representatives of the undermentioned Branches: - Cherry Gardens - C. Ricks. G. Hicks, S. W. Chapman, Joseph Lewis, T. Jacobs, Joseph Tozer, H. Lewis, H. Jacobs, C. Jacobs; Clarendon—J. Potter, A. Harper, A. L. Morphett, L. C. Spencer, E. A. Harper, S. J. Tester, A. A. Harper, H. Morphett, J. R. Nicolle, H. C. Harper, J. Piggott, W. A. Morphett, T. B. Brooks; Blackwood-W. L. Summers, C. G. Savage; Meadows-Wm. Phillips, R. G. Morphett, G. T. Griggs; Summertown-W. Squires; Uraidla-G. Prentice, E. Hawke, F. H. Stacey, L. W. Collins, F. Y. Cobbledick, E. Hart, F. H. Johnson, J. M. Bonython: Morphett Vale-L. F. Christie, T. Anderson, E. E. Hunt, A. C. Pocock; Longwood-E. W. Beythein, C. J. Blakely.

The chair was occupied by Mr. J. Spencer, who, on behalf of the Clarendon Branch, welcomed the visitors and delegates. He referred to the value of the information which was imparted by meetings of the various Branches, and expressed the hope that the gathering would be a profitable, pleasurable, and instructive one. He called on Mr. G. Laffer, M.P., to open the Conference.

OPENING ADDRESS.

Mr. Laffer, in declaring the Conference open, apologised for the absence of the Minister of Agriculture (Hon. C. Goode, M.P.), who was in another State on official business. It was very gratifying, said Mr. Laffer, to notice the very good attendance at the Conference, especially when they knew that so many had come such long distances to be present. This indicated what an interest was taken in the Agricultural Bureau, and demonstrated that they valued the opportunity of discussing their work.

THE SEASON.

The much improved outlook at present was a matter on which they could well congratulate themselves. There was every indication of a splendid harvest, and the fruit crop promised to be at least as heavy

as any they had had in the history of the State. However, the marketing outlook was not altogether satisfactory. In view of this the executive of the Fruitgrowers' and Market Gardeners' Association, had, as far back as three months ago, at his instigation, appointed a subcommittee. The Government were approached with the object of ascertaining whether it was practicable to introduce South Australian fruit into the United States of America. This seemed to As to the European market this year. be the solution to the difficulty. on account of the disorganisation which existed there, it was very questionable whether any quantity of fruit could be absorbed. German market, of course, was closed; the Russian market was prac-In addition, the French railway services were being That left the English market only utilised for military purposes. for them, and they must realise that, on account of the war, and the necessity for economy which was being urged on the people, there would not be such a great demand for fruit, which was still regarded much as a luxury. Further than this, there was the difficulty which existed on account of the congestion at the ports, which practically made it impossible to market perishable produce. He had urged the wisdom of calling a conference of representatives from each of the States, with a view to regulating the quantity of fruit that should be sent to this market, for he felt that if too great a quantity were supplied to the home market, the result would be chaos. He had also urged the wisdom of sending a representative to the United States with the idea of determining the extent to which Australian fruit should be absorbed. He was satisfied that if the market there were properly organised it would be capable of taking 1,000,000 cases of fruit annually. It was objected that the prices ruling there during last season would not be profitable to Australian growers, but last season's prices should not be taken as a criterion; for it was one of plentitude, in which cases prices always ruled low; but such seasons were generally followed by years of shortage and higher prices. At the present time American apples were selling on the Adelaide market at 22s. per case. There was a boat shortly due to arrive at Sydney carrying 50,000 cases of fruit for Australia; surely, therefore, in the American off season, Australian fruit should find a demand. matter was one of urgency; he was of the opinion that they would have more fruit this year in South Australia than they had ever before had in the history of the State. Plums, apricots, and pears were very heavy, and he opined that there would be at least half a million cases of apples and pears to dispose of. Immediate action was necessary to ascertain the value of the American market for Australian fruit. He declared the Conference open.

A vote of thanks was accorded Mr. Laffer for his services in opening the Conference. It was decided to convey the sympathy of the Conference to Mr. Phelps, of the Clarendon Branch, who was prevented by an accident from presiding over the Conference.

PROGRESS IN FARMING.

A paper by Mr. W. Goldsmith (Morphett Vale Branch) on this subject was read, in his absence, by the General Secretary (Mr. G. G. He referred to the improvements which had been effected in cultivating implements and harvesting machinery. of fallowing, he said, was an important factor in increasing the yield of the land, by making available food that would otherwise be inacces-Fallowing and cropping, without the addition of sible to the plants. fertilisers, however, would result in the deterioration of the soil; therefore the dressing of super. was an important factor. "If we can grow, say, two crops in five years, with 1cwt. dressing of super. with each crop," he said, "is it not possible to grow three payable crops in five years by giving the land 2cwts. of super. with each crop?" attention could profitably be given to the manuring of grass lands in the hills districts, he considered, and instanced hills that were formerly bare and windswept, becoming covered with good, sweet feed after being dressed with 14cwts, of super, to the acre. Experiments carried out in a small way would greatly increase the interest in farm life.

Mr. A. C. Pocock (Morphett Vale Branch), explained that in their district the practice of alternating fallow with wheat had gradually become unprofitable, and it had been necessary to change that practice. Heavy manuring and rotation of crops had been adopted. The heavy manuring produced a great bulk of natural grass which could be ploughed in or fed off with stock. Hogweed grew luxuriantly, and proved a valuable fodder for sheep. Some discussion took place in which suggestions were made in regard to the use of bonedust in addition to superphosphate. Mr. Quinn (Government Horticultural Instructor) explained that bonedust contained phosphate of lime in a comparatively insoluble form, and it only became available readily where the rainfall was heavy, and an abundance of organic matter was pre-When applied to calcareous soils bonedust rapidly reverted to an insoluble form. Where the conditions were suitable the use of bonedust would be attended with success, as it had the advantage of containing a percentage of nitrogen. He had noticed that where superphosphate had been applied to the land for some considerable time, clover was usually very abundant, and to a great extent it took the place of peas in replenishing the soil.

Mr. W. L. Summers (Blackwood Branch), referred to the very heavy growth of hogweed which followed heavy manuring. He suggested a rotation of peas, wheat, barley, or green crop, followed by bare fallow, associated with liberal manuring. He strongly recommended growing peas immediately before a crop of wheat. He thought the peas could be grown near the coast, provided the locality was not too exposed. Various opinions were expressed regarding the advisability of growing peas on fallow land. Mr. Harper (Clarendon Branch), thought that the growth of hogweed should not be encouraged. The Chairman said that the success which would attend pea-growing depended to a great extent on the condition of the land on which they were sown.

LESSONS FROM THE DROUGHT.

- Mr. C. Ricks read a paper on this subject. It was the duty of the people, as a whole and individually, to make provision against the recurrence of a period of drought, he said. In good seasons, such as the one on which they were on the eve, they should take the opportunity of conserving fodder for stock. He quoted extracts dealing with the methods of making ensilage, and urged farmers not to neglect this means of storage. The matter of water conservation, also, should receive attention. He advised landholders to spend a certain amount of time each year in constructing tanks and dams. In many places in the hills splendid natural catchments were available. In places where the undertaking would be too great for the individual, and a number could be served by the supply, these could co-operate in the work. Activities of this nature would do away with the danger of loss of stock similar to that which occurred during the past year. He also stated that the Government should institute a national granary as a provision against lean years.
- Mr. G. T. Griggs (Meadows Branch), supported the manufacture of ensilage. He had made ensilage for the past 20 years, and had found it invaluable, particularly for the feeding of dairy cows. If a pit were not available the material could be made into stack silage. Clover was excellent for this purpose; care should be taken that the crop was not too green when put down as silage. Mr. S. W. Chapman (Cherry Gardens), uttered a warning against overstocking of farms.
- Mr. W. L. Summers (Blackwood Branch) said that more discretion should be exercised in the feeding of stock; a considerable proportion of the chaff fed could be replaced by grains and other concentrates, and this would effect a considerable reduction in the cost of feeding. Mr. C. G. Savage (Blackwood Branch), said that at Roseworthy College long green stuff was mostly carted to the silo on the day on which

it was cut. It was well trampled down and a good proportion of coarse salt added. The temperature was kept as low as possible.

Mr. G. Quinn (Horticultural Instructor) emphasized the fact that for ensilage various plants could be used which were of little or no use for other purposes. Many years ago ensilage had been successfully manufactured from a mixture of artichokes and straw.

In reply to a question by Mr. Harper (Clarendon Branch) as to whether Cape marigolds or dandelions were of value for ensilage making, Mr. Ricks said that most green stuff was suitable for the purpose. Mr. Blakely (Longwood Branch), asked whether chaff could be kept in bulk for any length of time. Mr. Summers (Blackwood Branch), thought that so long as the chaff was dry there should be no difficulty in keeping chaff in bulk for a considerable period, and the Chairman indorsed this view, adding a warning to store the chaff in a vermin-proof bin or building.

DAIRY CATTLE FOR HILLS DISTRICT.

In the absence of Mr. Suter (the Dairy Expert), and in view of the importance of the subject, the Government Veterinary Lecturer (Mr. F. E. Place) gave an address on the most suitable lines for improving the local dairy cattle. There was a general tendency, said Mr. Place, for the cattle in the hills to degenerate to a weedy standard, and the difficulty which confronted them was to raise the standard of their animals by increasing their size. Of course, the bull was the most important factor in this connection, as under present conditions it was not economically practicable for dairymen to cull their cows. the guiding factors which should be considered when the purchase of a bull was contemplated was the shape of the animal. It was not necessary to look at the hindquarters to determine whether the animal was A glance at the forequarters would indicate that. called dual purpose Shorthorn was a beast that became very heavy in It was useless to have an animal that ran to flesh and became too heavy for his work. The Ayrshire bull also was one that he would not use if he were dairying in that district. As a general rule it would be found that the teats of the Ayrshire cow were too small. were desirous of securing quantity and quality of milk they would naturally turn their attention to the Holstein Friesian, but the position with this breed was that if they wanted a large cow that gave a large quantity of milk they must have country on which to run that In these hills, therefore, a Holstein Friesian bull would become leg-weary and miserable, therefore he was not likely to prove a good His personal inclination was for an animal of the stock getter. Devon type; the class of herbage, the climate, and the class of people

However, the ineven were peculiarly similar to those of Devon. troduction of animals of the Devon class would mean importation from either North or South Devon, and this was out of the question for the present season. In the Hindmarsh Valley he had noticed what was tending to be a distinct breed-a cross from the Lincoln Red Shorthorn and the Jersey. The herd had been bred for a number of years, having been selected for both shape, size, and production, and it was becoming a fixed type, particularly suited to this class of country. The class of bull which in present circumstances was most likely to It must be remembered meet their requirements was the Jersey. that their country was better adapted to carry a lighter class of cattle to greater advantage than a heavier breed. Therefore they would do well to procure pure-bred Jersey bulls for use on the grade cows which they now had, and buy them on their dam's record.

MARKET FOR AUSTRALIAN FRUIT.

Mr. C. Ricks (Cherry Gardens), moved—"That the Government be urged to take immediate steps to endeavor to open up a market for South Australian fruit in America or elsewhere. This Conference is of opinion that if the other States will not co-operate in this direction without delay, the South Australian Government should at once send an officer to America or other likely place, to take action in the matter."

This motion was seconded by Mr. S. W. Chapman (Cherry Gardens), and carried unanimously.

LUCERNE.

This formed the subject of a paper by Mr. L. V. Porter (Blackwood), which was read by Mr. C. G. Savage. The writer of the paper explained that he had more particularly in mind the cultivation of small strips along creek banks, &c. He had sown an area which had bee thickly covered with sorrel, simply turning the sorrel under, and the distributing the seed, with the result that the sorrel was completely The general requirements of the crop in question were water, good drainage, and lime. In this district, in a normal year, at least two good cuts of lucerne could be obtained without artificial irri-The crop required a fine seed bed, and an extremely light gation. He had had the most successful growth from a plot which had been liberally dressed with lime, turned over to the depth of a fork, and broken up finely. On this bone super, was broadcasted, then the seed, and the land lightly raked and covered with a mixture of stable manure and soil. It was very necessary to guard against bury ing the seed too deeply. Autumn or spring sowing could be practised with the former a nurse crop was usually provided, to protect the young plants from the frost. Summer planting in this district would ensure a better germination and a crop more free of weeds, but irrigation would be necessary. An annual hoeing and the application of bonedust, lime, or stable manure, would considerably benefit the crop. Of the various methods of watering he had had most success by running the water on to the crop by means of a hose. Thorough floodings at rather longer intervals were more satisfactory than frequent sprinklings. Of the different varieties of lucerne tried, he had found the Hunter River and South Australian most satisfactory. Last year, from an irrigated plot, he took seven cuts, averaging about nine tons of green stuff to the acre.

In reply to a question regarding lucerne "flea," Mr. W. L. Summers (Blackwood Branch) said that, on the plains, this pest had not proved so troublesome in instances where the lucerne had been irrigated by flooding, as in cases where sprinkling was adopted. Dressings of "gas lime" had been tried with a fair measure of success. Probably the application of superphosphate would be beneficial.

PIG RAISING.

In a paper under the heading "Points about Pigs," Mr. R. A. Keddie (Woodside) said the pig was worth more to the average farmer than he usually cared to admit. Taken year in and year out the pig account would show a handsome credit balance. Many farmers thought that more profit was made by buying pigs and fattening them, but he preferred the policy of breeding one's own stock. The piggery should be about 100 yards away from the dwelling house, preferably on a rise, and he favored concrete, stone, or brick, with an iron roof. Water should be laid on and feeding troughs installed. So far as the breed of pig was concerned, the farmer could not go wrong if he went in for the Berkshire or crosses with Only good boars should be used. Sows lacking type and other characteristics of their breed should not be bred from. should be relatively large, and not be served before they were eight or nine months old. The period of gestation was three months three weeks and three days. While the sows were in that condition they should be allowed to run in a small paddock. A week or two before farrowing the sow should be brought into the sty. Short, and not long, straw should be provided for her to lie upon.

TIME TO WEAN.

It did not pay to allow a sow to attempt to rear more than a dozen pigs, and the puny youngster should be disposed of to the best advantage at an early date. While the sow had her litter she needed rich milk-producing food and plenty of it. At about a month pigs began to "feed on their own," and at about two months they should be weaned and castrated. The sow came into season again from three to seven days after weaning. When the young pigs were three months old they should be turned into a field for exercise. To produce uniform high-class products pigs must be fed regularly and well. Peas produced excellent bacon, and wheat, barley, and pollard were also suitable. Green stuff, such as cabbages, lucerne, and berseem, were necessary. In the hills all types of marrows, pumpkins, &c., could be grown to perfection and would provide a cheap and valuable form of feed.

Mr. C. Ricks (Cherry Gardens), thought that the young pigs should be castrated when two to three weeks old. In reply to a question, Mr. Place said that the Berkshire sow was a very suitable one; a cross between Berkshire and Essex was a good bacon producer. Mr. Ricks (Cherry Gardens) thought that crossbred sows were more prolific than pure bred. Mr. Place said that large litters were not always the most profitable, as a smaller number of pigs matured more quickly. A sow should be served about a week after weaning. Some discussion took place regarding the merits of stone, concrete, and other floors for pigsties. Mr. Place recommended a concrete floor fitted with a movable wooden bed for the pigs to lie on. In reply to a question by Mr. W. L. Summers (Blackwood Branch), Mr. Place said that lucerne chaff, with grain, made into a soup, was a ration for pigs which produced excellent results.

Mr. Potter (Clarendon Branch), moved that Branches concerned be notified "that the Conference views with concern the absence of the writers of the papers which had been contributed." The motion was supported and carried.

Mr. Jacobs (Cherry Gardens), moved that all members of Branches attending the Conference be allowed to vote on any questions which arose. Mr. Brooks seconded, and the motion was carried.

On the motion of Mr. A. L. Morphett (Clarendon), it was resolved "That in the opinion of this Conference, extensive firebreaks should be made in order to avoid the possibility of the occurrence of bush fires during the hot weather."

The Chairman offered a suggestion that Branches should endeavor to include in their membership the younger men of the respective districts, and on the motion of Mr. T. B. Brooks (Clarendon Branch) it was resolved to recommend Branches to do their utmost to interest younger men in the work of the Bureau, and to encourage them to become members.

NOXIOUS DWELLERS IN THE CREEKS AND SWAMPS.

The Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) delivered an address under the title mentioned above. He explained that he had previously dealt with the importance of water to stock, but pointed out that it was equally important to the growth of several classes of organisms, whose bodies contained more than the 60 per cent. which went toward making up the bodies of higher beings. "These organisms," he said, "belong to both of the great divisions of living beings, the vegetable and animal kingdoms. Possibly those belonging to the vegetable are capable of working greater havor than the animal, but it is only with the latter that we shall be concerned now. The vegetable organisms, generally speaking, are dealt with by bacteriologists. Myriads of these tiny plants are quietly and unostentatiously carrying out their work, nitrifying the soil, rendering putrid matter harmless, helping horses and cattle to digest their food, and, like producers, lead a very active existence, and seldom come into the forefront of public discussion, while the comparatively few harmful germs are constantly being paraded and talked about till one almost comes to believe in their ubiquitous presence.

Parasitic Vegetable Organisms.

"As time is limited we may well leave the vegetable organisms and confine our attention to the members of the animal kingdom, who, like the sons of Rechab, are water drinkers; but in that fact the similarity ceases, for these organisms generally become parasitic upon some host rather than remain dwellers in their own tents, and it is this habit that renders them noxious and of economic importance, not as producers, but as consumers. Their name is legion, and they range through many grades of the animal world, from being merely specs of living tissue—protoplasm—to highly organised beings like worms, or still more complete flies, and it may be taken for granted that the smaller they are the greater their potentiality is for harm. Their grade of development has much to do with their habit of life, and some become permanently associated with their host, living inside his tissues, while others do not confine themselves to one host, but pass different stages of their existence with several hosts; while, again, some dwell in the inner recesses of organs like lungs or bowels, while others fasten on the skin and outer covering of the beast.

"The mischief they are capable of doing varies; some of them actually make poisons, while others interfere with the natural functions of the organ in which they happen to be. Others, again,

interfere with the changes that are necessary in growth, breaking down the ferments and protective bodies that are formed naturally in the host's system; while those that pass from host to host frequently act as carriers, transmitting some small but harmful parasite from beast to beast, such being often harmful to the carrier as well as the host. Examples of these various forms of harm may be seen in the braxoid sheep when he staggers and dies poisoned by microscopic parasites; the lamb, whose liver is riddled with wandering worms; the colt that grows gaunt and haggard because of the round worms in his bowels; the horse, paralysed by the activities of bloodworms; the cow, dying of redwater brought about by parasites in the blood carried to her by biting flies; the sow, whose udder becomes a cancerous mass from the irritation of lice. And the list could be extended indefinitely.

SWAMPS.

"Now the trouble with the swamps and the slackwaters of the overflow from creeks is that they become the favorite homes of these little beings, who in themselves are ceaselessly active, and yet prefer the moist, undisturbed shade for their work; and to the man who is producing milk or meat, it is a question of economical importance whether he shall ignore their presence and lose his stock, or whether he shall expend a certain amount of labor and destroy their homes. It is this economic aspect of the question that one would lay stress on. The keynote to the extermination of these noxious dwellers is drainage and water conservation, because the drained swamp and the deep water of the reservoir are no longer suitable for their business. One is quite aware that such operations require outlay, and one believes that any form of farm operation comes under the same head, some (such as doctoring sick animals) are not remunerative; others, like water distribution, are, if not taken in hand 'with systematic irregularity.'

"Now we will look at, for a few minutes, some of the commoner of these pests, as they appear in the hills. Commencing with the simplest of them, we notice sometimes in the early morning, and at sunset, when the sun's rays are mainly horizontal, a shimmering slime upon the water's surface that we do not see in the day time. This is due to myriads of simple one-celled animals called amoebae, many of them quite harmless, but some of them fond of taking up a fresh form of life amid the cells that line the stomachs and bowels of animals, destroying them to feed upon them, and so rendering the food that the animals take of little use, as it must be absorbed through these cells, which also surround and protect tiny blood vessels, which, becoming exposed, pour their contents into the

bowels, and dysentery is the result. A step above these amoebae are Sporozoa, including Coccidia and Haemosporidia and Sarcosporidia, quite important beings in their own way, not just turning themselves outside in when they want a meal, as the amoebae do, and then turning themselves inside out if they get indigestion, but taking in their food and absorbing it just as their betters do. These are quite miscroscopic organisms, but their presence may often be detected forming the little white spees on the livers of rabbits and fowls, and in the last the white specs about the size of a millet seed on the gullets of sheep, or at least of those sheep which survive the invasion. Many a good hogget or thriving lamb straggles behind the rest and staggers and dies, and many a ewe heavy with twin lambs wanders off from the flock and is found dead later, poisoned by the heavy invasion of these parasites throughout the muscles, which has resulted in Nature trying to overcome them by pouring out fluid into the big cavities of the chest and belly, which have absorbed the specific poison and thus attained a curious sweetish rotten smell derived from substances which in an ordinary way the liver would have dealt with and made use of, but which in the present case it is only too anxious to be rid of, and so that organ seems somewhat large and soft when the sheep is opened.

"Whenever there is an invasion of this class of parasite, and quite frequently also when larger ones, such as worms, attack a beast, Nature floods them out. This results in the fluid found in the cavities, and in those swellings which alarm some people when they see them under the mare's belly or down the horse's breast, which are pasty to the feel, and the hole which the finger makes when pressed upon them takes quite an appreciable time to fill up again. They are more a sign that the danger is passing than that it has begun, but somehow they seem to be the first thing that is noticed, whereas the animal has shown symptons of sickness days before. Plainly, if one desires to escape these troubles, the way is to dry up the puddles and swamps in which the organisms find temporary homes.

EVIL PARASITES.

"Lower in the scale of life than the preceding, but not mentioned before because they are seldom introduced directly into animals, but more frequently, after passing a stage of their existence in some other host, such as a fly or a tick, are the trypanosomes and spirochetes, which produce such dire diseases as sleeping sickness and venercal in man, and surra and dourine in horses—diseases of stock that fortunately do not exist in South Australia; but it is more than probable that similar organisms do produce diseases such as redwater and

coasting in cattle, and that flies like the biting stable fly (Stomoxys) and the March flies (Tabanidae) play their part as intermediate host, sucking the parasite from an infected animal and injecting it into a sound one as they vomit prior to a fresh meal, for in the necessarily brief examinations that the speaker has been able to carry out in such cases he has evidence enough to warrant a much fuller investigation being carried out, in order that suggestions may be made as to limiting the breeding of such insects as are likely to be the intermediate hosts.

FIJES.

"With regard to flies, the house fly and its kind, its kith and kin, and the stable fly breed in horsedung, not disdaining the privy either. Their eggs and maggots must have moisture, and the filthy puddle and foul swamp are splendidly designed for their speedy propagation, for every now and again they must come to the surface to breathe, and they can be very materially lessened in number by dusting borax on at the rate of a quarter of a pound to a cubic vard. As 20 hatches of a hundred or two at a time during the season is a moderate estimate of their rate of increase, every fly killed means a very material reduction in their numbers later on. The March fly family (Tabanidæ) prefer coasty conditions in which to breed, their maggots developing in the mud at the brink of the creek or around the shrinking puddle shaded by low scrub. In other parts of the world this has been so well realised that districts in which no animal could be reared have been rendered quite healthy by the simple method of cutting and keeping down belts of scrub that used to be the harbor for the flies, while in South Australian coasty country it is a wellknown fact that removal of stock to cultivated ground is both protection and remedy, though it does not seem to have struck stockowners why this should be so.

"In other parts of Australia flies, originally vegetable feeders, have proved true the proverb which says that 'Opportunity makes the thief.' by giving up their original diet in favor of dead rabbit or mutton, and then going a step further and seeking to develop their maggets on the skin of the living animal, probably at first on the debris at the root of the wool, and then taking the very short step from there to the living skin. Again, moisture and mud have played their part in the transition, and what has happened elsewhere may happen here if carcasses are left to rot where they lie in the swamp and creek.

THE SCRUB DWELLERS.

"The four kinds of bot flies that needlessly cause so much alarm to horseowners and a certain amount of discomfort to horses, also prefer the shady scrub along the creek to other parts. The running creek,

the puddle, and the swamp are the chosen homes of the various families of gnats and mosquitoes, but the red wrigglers one so often sees in puddles and troughs are the larvæ of many of these, and not bloodworms, which their color leads many to believe. The mosquitoes, however, are capable of carrying the minute germs or plasmoda, which in some countries cause malarial fevers, both in man and live-In South Australia this, fortunately, does not happen, but their numerous bites are often a source of intense irritation to animals. and cause them to lose flesh and even to cast their young at times. The creeping horse fly (Hippobasco equina), which so often causes a quiet, good-tempered horse to lash out, apparently without rhyme or reason, is also a lover of the shady scrub by the creek side. Another family that loves the shady pool is the leech (Haemopis sanguisaga), which will hang round the feet and cause very nasty sores: but a worse happening is when they are swallowed very young and grow to maturity in the horse's throat and nose, causing a very nasty cough and chronic discharge. Fortunately they are large enough to be readily seen if one stands with the sun over one's shoulder and examines the mouth in the same way as one would for defective teeth, and a syringing with salt and water will cause them to leave go.

THE DANGEROUS FLUKE.

"But the worm family, perhaps, appeals more directly to the man on the land, because here there is generally something one can see with the naked eye. First in this family, both in frequency and harmfulness, comes the fluke (Fasciola hepatica), interesting because of a very varied life history, and illustrating in a fascinating way how one parasite may go through different hosts and appear to be a totally distinct creature in each. The adult fluke, like a brown tealeaf, about half the size of a halfpenny, dwelling in the liver ducts of sheep or cattle, lays eggs which pass out with the dung into water, where the embryo opens a trap and escapes into the fluid as a very lively water animalcule till it meets with some small snail, and, stiffening out like a rod, penetrates into its lungs.

SNAIL IS A HOST.

"It is of interest to note that as far back as Henry VIII.'s time an observant agricultural writer said that if one wished to keep one's sheep free of the rot one must not let them feed where there were snails. In this host the embryo changes again into a mulberry mass of little bags or organisms called rediæ, which leave the breathing organs and travel to some other spot, generally the snail's liver, where the parasite again changes its form into cells called cercariæ, a thousand of which may develop from a single fluke's egg. These by

suckers and tail wriggle their way out to water again, and stick as tiny white slimy points to the underside of herbage by the water's edge or on damp flooded pasture, naturally low down on the plant, a point of the greatest practical importance in avoiding infection, for a pig-mouthed sheep that cannot crop close is very rarely found to be fluky; a point, too, which emphasises the danger of overstocking, and explains why cattle, which do not crop so low as sheep, are less fre-In fact, when they do so it is generally due to their quently affected. having drunk the parasites and their hosts. The encysted cercariæ can remain alive on pastures as long as there is moisture. throws them into a state of suspended animation for an indefinite time. When the parasite reaches the animal's stomach, the covering is dissolved, and the creature finds its way through the blood to the bile ducts in the liver.

EFFECTS OF INFESTATION.

"It is probable that the infestation is most common in the autumn months, but it may occur at any time of the year, and the symptoms are divided into stages. First, the attacks, which may continue from one to three months, during which the sheep may do very well, because of the stimulation of the liver. Second, bloodlessness, and the fatty, yellowish appearance of the eye, whiteness of the skin, brittleness of the wool, shortness of breath, and slowness of movement, hardly struggling at all when caught. Third, wasting and progressive emaciation, bottling under the jaw, and swelling under the belly and legs, casting the lambs, and frequent deaths. The fourth period is one of recovery, the symptoms slowly disappearing. The means of prevention have been sufficiently indicated, and treatment is not satisfactory, though salt, sulphate of iron, and hand-feeding help. case of a valuable sheep a dram of liquid extract of male fern in a little milk and eastor oil may be given three days running with benefit, and repeated once a fortnight for a few times.

DANGER TO MAN.

"Man becomes infected with fluke, but not by eating fluky livers. He in most cases swallows the parasites similarly to cattle, and then they develop in the usual way. Another profit-eating pest is the hydatid, of which there are several kinds, but the commonest rejoices in the name of Echinacoccus veterinorum, and is for practical purposes typical of the others. The adult is a tapeworm less than half an inch long, that may be found like plush in the bowels of dogs and foxes. The eggs are passed out with the dung of these animals, and infest puddles and swamps. They are swallowed by animals, and passing by means of the blood to organs like the liver, lungs, cavity

of the belly, and so on, commence to grow, reaching in a few months the size of hens' eggs, and often, as in the case of the pig, enormously enlarging the organ in which they are destroying it by the pressure of their cysts, and setting up diseases typical of the part in which they are developing. Not content with simply growing as cysts, they multiply inside the cysts, and there may often be hundreds of daughter cysts in one large one. In course of time these undergo a change, which enables them to become adult worms, and are passed out with the dung to take up their abode in the dog, or perhaps more frequently the dog or fox eats the raw organs of the dead animal or the offal carelessly thrown out, and so the cycle goes round again.

DOGS AS CARRIERS.

"These hydatids look harmless enough, just little watery blebs in the lung or liver, and the butcher's boy pricks the bleb to see the water squirt out, and thus spreads the microscopic daughter cysts all over the place, to run with the moist filth to the puddle that drains into the creek, where the milking cows drink, and when one or the other of them begins to cough and waste away, she is thought to have tuberculosis, perhaps, and is quietly killed, in defiance of the Stock Diseases Act. Much to everybody's disgust she seems quite healthy, except for these harmless little blebs, and when one or two of the neighbors have to go down to hospital to be operated on for hydatids, still nobody connects the frolic of the boy with the trouble, or thinks that the dog had anything to do with it when, after a hearty meal of liver that was too spotty to sell, he sat down near the creek, that in a day or two overflowed on to the lettuce bed.

OTHER VERMINOUS CYSTS.

"Other kinds of cysts are the water blebs (Cysticerous tenuicollis) that one often sees in the belly of sheep and pigs, which develop into a tapeworm in the dog; and others are not often seen, because lung Eight varieties are common, worms are essentially swamp dwellers. and each thrives best in some particular kind of animal, such as sheep (Strongylus filaria and Rufescens), calf (S. micrurus), pig (S. paradoxus), and produce verminous bronchitis or husk. Autumn is the time of year when the disease is most prevalent. The eggs are coughed up or otherwise passed by affected animals. Others take them in They reach the lungs by means of the blood through the stomach. circulation, and pass the rest of their existence in the air passages, bringing about cough, wasting, and weakness, and the worms are found after death to have choked the bronchial tubes all together, and in some cases they set up inflammation of the lungs as well.

others they are caught, walled in, and form nodules that are sometimes mistaken for tuberculosis.

REMEDY.

"One favorite method of treatment is to gas them with similar gases to those nowadays used in warfare, but the speaker cannot recommend the method, as the after effects are not always the most Neither is the system of ejecting into the windpipe altodesirable. gether free from risk. However, the administration of arsenic does good, as that drug is very quickly absorbed by the blood, and kills the worms, while at the same time it acts as a tonic on the animal. In the case of sheep and lambs it can be given in a very convenient way, as Cooper's tablets, or 2oz. of arsenic and 2oz. of washing soda may be dissolved in two gallons of water, and from one to two tablespoons of the mixture should be given to each affected beast every morning for three days, and again after the lapse of a week. Although a little more costly, the tablets are much more convenient, and the regularity of dose is assured. Better results will follow this line of treatment Sheep must not be left on infected pasture, than any of the others. which will be all the better for a heavy lime dressing.

"They are very small, and in between the muscles of the ox (cyst-triss) or pig (cyst-cell utoxæ), which develop into tapeworms in man, and only continue to exist because there is sufficient moisture to enable them to survive during the period clapsing between their discharge from one host till their ingestion by another, so that a severe and prolonged drought is not an unmixed blessing in enabling one to keep this class of pest in check. There are numerous other parasites that creep or fly that one can find by the creek or in the swamp, but a catalogue of them would prove wearisome, and they can all be driven from their homes by destroying the conditions favorable for their spread, so that a word to the wise is enough. Bloodworms have not been touched upon because their habits and treatment have caused them to have a leaflet all to themselves.

SHALLOW PUDDLES MOST DANGEROUS.

"But a word of explanation must be added with regard to an early remark respecting water conservation in depth as a means of destroying water-borne pests. Shallow puddles and swamps are dangerous because they provide the best conditions for the survival of these nuisances, while the deep body of water proves to be their destruction, insomuch that they are carried to the bottom by the sinking debris, and there deprived of the oxygen they require.

"For the same reason the deep well provides pure water that the shallow spring fails to, and many in the hills have already found the advantage of damming a gully and forming a reservoir against drought, without perhaps giving a thought to the fact that by so doing they are improving the hygiene of their stock as well. Gresham. the celebrated economist, stated a law that 'Bad money drives out good,' and the same holds good in regard to the inhabitants of a district. The malaria-bearing mosquito changed the fertile valley of Mesopotamia into an arid desert; the tsetse fly holds in its grip thousands of miles in the heart of Africa, where sleeping sickness enthralls the would-be colonist. The vellow-fever gnat drove the French from the Panama. and had to be exterminated from the canal belt before the Stars and Stripes could wave over either ocean; and even in the hills, where Nature smiles so lavishly that man can afford to be careless, there is a danger of the fly and the worm becoming masters of the situation if the swamp and the creek are left uncontrolled, while in the hand of the irrigationist, 'The clods of the valley shall laugh and sing.' "

THANKS TO THE HOSTS.

Mr. C. Ricks (Cherry Gardens), supported by Mr. A. C. Pocock (Morphett Vale), proposed a vote of thanks to the Clarendon Branch, who had carried out the excellent arrangements of the conference, and the proposition was carried by acclamation, as was also the vote of thanks proposed to the press.

In the evening the Horticultural Instructor, Mr. George Quinn, delivered an address, illustrated with lantern views, dealing with the prune. This will be published in a later issue.

1916 CONFERENCE.

It was decided that the conference should next year be held at Morphett Vale early in October.

AGRICULTURAL BUREAU REPORTS.

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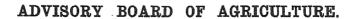
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^{*}No report received during the month of October. + Formal report only received.

‡ Held over until next month.



Dates of Meetings— November 10th and December 8th, 1915.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

Edited by H. J. Finnis.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82in.). September 21st.—Present: 14 members and two visitors.

POULTRY:—In a paper on this subject, Mr. S. Thomas said that in their district the uncertain rainfall frequently caused unsatisfactory returns from wheat-growing and dairying. Profits from poultry, however, did not fluctuate with the rainfall, and it behoved them to take up such sidelines in order that their incomes should not suffer to such an extent in drought periods. The best fowl for profit was the egg producer, and the White Leghorn breed was the best. Possibly, under certain circumstances, other breeds might lay as well, but the cost of production was higher. To obtain the best results, special attention should be directed to the housing of the birds. The houses should provide thorough shelter against cold, bleak winds, sudden changes of temperature, and rain storms, and they should be constructed in such a manner as to ensure absolute freedom from veruin. Galvanized iron was probably the best material for the house. A system of housing should be adopted which would enable birds of different ages to be housed separately, and the older birds would require to be culled out as soon as they became unprofitable. He had had considerable experience with different breeds, and was of opinion that, with due attention, an average net profit of 10s. per hen per annum should not be unattainable.

Header v. Harvester.—Mr. Wallace initiated a discussion on this topic, and varied opinions were expressed by members as to the value of the respective implements.

AMYTON (Average annual rainfall, 11.82in.).

October 19th.—Present: 14 members and one visitor.

Care of Farm Machinery.—In a paper with this title, Mr. Foulis emphasized the need for taking every care of farm implements and machinery, in view of the heavy outlay which their purchase involved. Machinery should be periodically examined and overhauled, and when finished with it should be placed under cover for protection against the weather. An implement shed should be constructed of stone walls and iron roof, in order to ensure sufficient protection for implements placed inside. A coat of paint applied periodically to implements, &c., would be found to materially lengthen their life. In discussing the paper, members referred to the necessity for cleaning and oiling all machinery, and effecting all necessary repairs before putting it away after having finished a job.

Motor Traction v. Horses.—Mr. Schulz contributed a paper on this question. He said that on their flat country a traction engine of a light type would do more economical work than a team of horses. The engine had the advantage of being available for work at all times. It could be used for cultivation and harvesting work and also for such work as chaffcutting; more work could be done in a specified time. In periods of drought a considerable saving of feed could be effected. Extra labor might be required where a tractor was employed, but he felt sure that

the saving of expenses would more than compensate for that. Members, while agreeing with Mr. Schulz's general contentions, were of opinion that traction engines would have to be improved to be able to do all classes of farm work before they could be economically employed.

ARDEN VALE AND WYACCA (Average annual rainfall, 16.65in.). August 23rd.—Present: seven members and one visitor.

RABBIT DESTRUCTION.—In a paper on this subject, the Hon. Secretary (Mr. O. E. Hannemann) said that the practice of merely closing rabbit burrows was not effective. He advocated the digging in of the burrows, or, where practicable, ploughing them in. If they desired to exterminate the pest they would have to exercise a great deal of perseverance. Vigilance should not be relaxed as soon as the number of rabbits had been reduced, but they should persist with their war against the rabbit until the pest was exterminated.

ARDEN VALE AND WYACCA (Average annual rainfall, 16.65in.).

September 20th.—Present: eight members and one visitor. DAM SINKING.—In a paper on this subject, the Chairman (Mr. J. H. Wills) said the matter of water conservation was of the utmost importance in their district, owing to the limited and irregular rainfall. The provision of a dam was of great assistance in this connection. A site should be selected which would ensure a good supply of water for the dam. This should be, say, 60yds. by 30yds. by 4yds. deep. The top soil should be ploughed and scooped well out of the way, and the good clay should be used to line the surface of the dam, in order to prevent loss of water by soakage. The banks should be 3ft, higher than the level of the outlet.

HOOKINA (Average annual rainfall, 12in.).

September 21st.—Present: 10 members and two visitors.

Mr. P. Henschke read a paper on "Horse-driving," Due regard, he said, should be paid to the horse's temperament; some horses would require more punishment than others, but it should never be excessive; a stick was to be preferred to a whip. A driver should never lose his temper, for when that happened the horse would become confused. The Chairman (Mr. D. E. Madigan) said the driver's voice had a great influence on the horse's behaviour. Members agreed that the horses of a team should become accustomed to start pulling together on hearing the driver whistle. Some discussion took place on the question of co-operation.

> HOOKINA (Average annual rainfall, 12in.). October 19th.—Present: eight members and two visitors.

HARVESTING.—Mr. J. Carn contributed a paper, in which he expressed the opinion that the stripper was the more suitable machine to use for gathering the crop in The value of the chaff saved was quite equal to the cost of the extra this district. labor involved, and the lighter draught was very appreciable in the sandy soil. Members thought that in the North, where chaff was often very valuable, it was advisable to use the stripper; but further south, where heavy crops were grown and chaff was hard and of little value as a fodder, the harvester was by far the better method of dealing with the crop. Mr. Sheridon was in favor of the thresher.

> MORCHARD (Average annual rainfall, 11in. to 12in.). September 25th.—Present: 13 members and one visitor.

PREPARATION FOR HARVEST .- Mr. F. Scriven read a paper on this subject. said that preparation for harvesting was an important part of the methodical farmer's work. In preparing to cut hay the farmer should take every care that he had sufficient binder twine and machinery oil to meet all possible requirements. The binder or mower should be thoroughly overhauled, cleaned, and oiled in order to avoid the possibility of a breakdown. Whilst the hay was drying in the stocks there was an opportunity for the farmer to overhaul the wagon or trolly and select a site and make the necessary preparation for the building of a stack. After haycarting, the overhaul of harvesting machinery should be attended to in the same thorough manner, as well as seeing that sufficient cornsacks and sewing twine were on hand to contain the wheat yield. Members supported the writer's views.

Marketing of Wheat.—Mr. J. W. Reichstein read a paper on the marketing of wheat, contributed to the 1913 Congress. Mr. E. J. Kitto said that farmers generally should take pains to produce a better sample of wheat, as the results would certainly react to their advantage. Mr. Jasper contended that no dirty grain should be marketed, but it should be made use of as stock feed. The chairman (Mr. B. S. McCallum) thought that with a little care modern harvesting machinery could be made to produce a good sample of wheat. Mr. W. Martin suggested that farmers should take united action to endeavor to establish two grades for wheat-buying. The extra price which would be offered for the higher grade would be an inducement to the farmer to take greater care in the production of his wheat.

ORROROO (Average annual rainfall, 13.42in.). October 23rd.—Present: Nine members.

JUDGING A DARKY Cow.—In a paper with this title Mr. J. McNaughton said that a good dairy cow should have a deep frame set on fairly short legs, and a fine neck and head with bright eyes. The udder should be of good size and set forward enough to allow of the free action of the hind legs. The teats should be 2in. or 3in. long, an even distance apart, and thicker at the base than at the point. The milk veins should show prominently when the cow was in milk. The tail should be fine, with a good brush of long hair, and the legs should be clean. He favored a crossbred cow for dairy purposes. The Ayrshire breed was to be recommended for milk and the Jersey for butter production, while the Shorthorn breed was to be favored for meat. He would not recommend cross-breeding with the Hereford for dairy purposes. Feeding was of the utmost importance, as only cows in really good condition could be expected to give a liberal supply of milk.

QUORN (Average annual rainfall, 13.78in.). October 23rd.—Present: six members.

Tomato Growing.—This subject was dealt with in a paper by Mr. Cook, who had had 20 years' experience with this crop. He advised growers to sow the seed in fairly loose, slightly sandy soil, in boxes, placed in a hot house with a movable glass covering. When the young plants reached a height of about 2 in., they should be transplanted into jam tins with the bottoms and sides cut, and fied round Occasional removal of the glass covering would result in the plants They should then be planted out in beds, in small channels being hardened up. about 4in deep, and 5ft. apart, the plants being 2ft. 2in apart in the rows. The young tomatoes should be placed in holes about 1ft. 2in deep, into which had been placed a shovelful of manure. The string should be snipped from round the tin holding the plant, which should then be surrounded with well rammed earth, watered, and protected at night from the frosts by a small piece of bag supported by three stakes. When the fruit was set, water could be run down the channels, Staking or trellissing was not necessary in the North, as the fruit ripened better on the ground in this district, especially if it were occasionally watered by means of This caused a steamy heat; so, if it were desired to have the fruit a sprinkler. ripen quickly, less water should be applied. Seed should be selected from the earliest, and best plant. The varieties he recommended were: -- Garlma (which was a first-class tomato, except that it split badly if rain fell on it when the fruit was nearly ripe); Early Chalk, Acme (which was not quite such a good bearer as the other sorts); and Market Favorite. When trouble was experienced with black spot a solution of 1lb. washing soda, 2ozs. of bluestone, and 10galls. of water should be sprayed on to the plants.

TARCOWIE (Average annual rainfall, about 15½in.). September 22nd.—Present: 11 members and one visitor.

Weaning Foals.—In a short paper on this subject, Mr. G. Thomas advocated weaning the foal when it was from five to six months old, as a general rule; but if feed were falling off, he would take the youngster from its mother earlier. It should then be fed on plenty of good hay chaff, with the addition of bran and crushed oats. A sufficiency of good, clean water should be supplied daily. A warm, dry, and strongly-constructed stable and yard should be provided, and cleaned out every two or three days. The animal should be kept in for at least three mouths; and when turned out it should be fed once daily until sufficient feed was available in the paddock to ensure its doing well. Messrs. J. Symons and A.

Dempster agreed with the opinions expressed in the paper. Mr. J. P. Smith advocated feeding the mare well, allowing it to suckle the foal for six months; then muzzling the foal and allowing it to run with the mother. At the previous meeting a paper on "Hay" was read by Mr. J. Dempster.

WARCOWIE (Average annual rainfall, 12.16in.). September 25th.—Present: Seven members.

WEIGHING WHEAT IN BULK .- A paper on this subject was read by Mr. J. Feineler, in which he said:—"The system of weighing wheat over bridges has been in vogue for many years in Victoria and New South Wales, and in these States it is considered to be a great advantage to both wheatbuyer and farmer. present system of weighing is undoubtedly slow and unsatisfactory from a farmer's point of view. Oftentimes there are many teams waiting for hours for their turn It is true that a quick and experienced man can weigh off wheat as at the scales. quickly as two men can carry and build it, but is he not likely to make a mistake in his hurry? Is it not troublesome in windy weather to balance the scales? It is certainly strange that the farmer is always satisfied to take the agent's reckoning. He never asks for or gets a copy of each bag's weight, so that he can reckon it up for himself. The wheat harvest of 1912-13 for South Australia was 20,137,870 bushels from 2,658,715 acres. Now, after taking from this sufficient seed to sow the same area, there was still about 17,479,155 busnels, or 5,826,385 If the farmer through short weight, break of scales, &c., lost bags, for market. allb. per bag (which I maintain they did) it would in the crop just quoted be a total loss of 971,064 bushels. This, valued at 3s. 4d. per bushel, would be worth £161,844. Half a pound per bag would mean a loss of £80,900 to the farmers. In New South Wales the Government control the weighbridges, and will put down weighbridges at stations where 10,000 bags or more of wheat are sent away in one season. In 1910 there were in South Australia 100 stations which sent away 10,000 bags or over. The estimated cost of weighbridges is from £80 to £100, and an amount equal to the farmers' loss in one season, viz., £161,844, would be more than sufficient to pay for 100 bridges. If the Government were to put down weighbridges and charge at the rate of, say, 1s. per load for the use of the bridge, it would soon pay for the cost of the weighbridge and all the working expenses. If a harvest similar to 1912 were to pass over the weighbridges at 100 bags each load, and charged for at the rate mentioned, it would bring in £2,900, or sufficient funds to pay for over 30 weighbridges. The system would, if adopted, save the farmers considerable loss of time and money, and would pay handsomely, and give general satisfaction.'' In the discussion which followed the majority of the members favored the adoption of this system. Mr. Growden opposed the idea on the ground that the present system was quite satisfactory. He had weighed loads of wheat as check on the weight given by the agent, and had been well satisfied. He had also had duplicate lists of the weight of the bags, and he thought that anyone could get this if he asked for it.

WEPOWIE (Average annual rainfall, 13in. to 14in.). September 24th.—Present: 13 members and six visitors.

Conservation of Fodder.—Mr. F. G. Roocke read a paper on this subject. He said that hay was the best stock fodder for general use, but it was difficult for a farmer to be able to store sufficient hay for a two years' supply in order to provide against a possible drought. He recommended cutting a considerable proportion of the crop with the binder, and threshing the sheaves. He considered that headed straw mixed in equal proportions with hay and chaff produced food of good value. He had fed working horses on headed straw treated with pollard and molasses, with excellent results. All cocky chaff should be saved and stacked, as it would prove a great help when feed was scarce. Straw, cut after the reaper, was also well worth keeping. The growing of lucerne, if sufficient water were available, was an excellent practice, more particularly on farms where milking cows and poultry were kept. Some of the natural feed, such as wild oats and mustard, of which there was plenty in good years, could well be stacked and reserved for times when feed was scarce. The paper was discussed by members, who considered the suggestion for the cooperative purchase of a header to be a very good one.

WILLOWIE (Average annual rainfall, 11.90in.).

September 21st.—Present: 16 members and two visitors. CARE OF COLLARS AND SHOULDERS OF WORKING HORSES .- Mr. E. J. Kentish delivered an address on this subject. He favored the use of strong, solid, heavy pipe collars, with plenty of straw; old, shapeless collars should on no account be used. Collars should be kept in thorough order and well oiled. A new collar should be made to fit tightly against the horse's neck and shoulder, as it would become looser after it had been used for a while. A collar stuffed tightly, provided it fitted well, would give less trouble than one stuffed loosely, the stuffing of which was liable to become lumpy. A separate collar should be provided for each horse, and the hames should fit each collar in such a manner as When sore shoulders did occur, the horse should be to tighten it up properly. given absolute rest from work, and some lotion should be applied to the sores. When recommencing work with the horse, a woolly sheepskin pad should be placed over the sore portion of the shoulder. In discussing the paper, Mr. D. E. Greig said that when driving a colt he made it a practice to stop work frequently in order to avoid over-heating of the shoulders. Mr. B. E. Schmidt said that while it was a good practice to have a separate collar for each horse, a change of collars was often a great help in relieving sore shoulders; a breast strap was an excellent substitute for a collar when shoulder trouble occurred. A. Gray said that the padding of the collar should be worked up by striking the inside of the collar each time the horse was harnessed. Mr. Hawke considered spring draught of great assistance in relieving jar; backbands should be used to prevent the swaying of the traces, which caused irregular draught. A new collar should be soaked in water and not used too frequently until it assumed the shape of the horse's shoulder. Mr. J. H. McCallum referred to the value of clipping of horses' coats. Lard should be rubbed into a colt's shoulders a week before it was intended to work him. Mr. A. P. Greig recommended the washing of the horse's shoulders after unharnessing them. Mr. W. P. Foulis said that before harnessing a horse the hand should be passed over the shoulders to ascertain if there were any soreness. If soreness existed on the points of the shoulders the collar should be tightened and the draught of the harness raised; if the top of the neck were sore the collar should be loosened and the draught lowered; if the inside of the neck were affected the collar should be loosened, and if the outer edge of the shoulder were tender, the collar should be tightened. If the sore were above the level of the hames draught the latter should be lowered, and vice versa.

WILLOWIE (Average annual rainfall, 11.90in.).
October 19th.—Present: Nine members.

HAY-CUTTING.—In a paper on this topic Mr. A. P. Grieg referred to the need for care in the selection of a binder. He recommended the steel frame machine as being stronger and more lasting than the wooden framed, and outlined the advantages and drawbacks of different types of machines. The fan should be capable of being easily moved upward and downward and backward and forward. favored floating rollers on the elevators, as more space could be allowed between shorter leaves and the clevators, as more space count be anower newton the canvasses when required for a thick crop. The canvasses should always be slackened at night time, otherwise the dampness might cause them to tear or the straps to break off. The knotter jaws of the binder should be close down to the sheaf, as there was then less slack string when the sheaf was field. His experience was that the knotter jaws did not require to be very tight to do good tying. If they were too tight, the twine was liable to break before the knot was pulled off the jaws. When the string was left with an end tied around the jaws and the other hanging loose there might be several reasons for the trouble—the stringcutting knife might be cutting the string too soon, allowing it to pull through the jaws before they were closed on it to tie it; the retainer might not hold the string for the required length of time, or might not catch it at all, especially if the retainer were much worn; the jaws might not be closed soon enough, or if they were worn, the string might pull through them and not become tied. The knotter particularly should be kept in good order, and if the retainer or string-cutting knife were not doing their work, it might be due to the driving cog, or slide, or roller being slightly worn, so that the duties of the respective parts were not performed at the correct time. When cutting a thin crop, it was wise to have a double set

of fingers on the machine. The knives should always be kept sharp, in order to do satisfactory work. The machine should cut on the same level as much as possible, but, of course, it was often necessary to raise cutting level to avoid stones, &c. He believed in tying large sheaves, as less handling and less binder twine was required, and there was much less wear on the machine. The 6-ft. cut was the most convenient width for an average crop, but the 7-ft. cut was an advantage in dealing with a light crop. When dealing with a heavy crop, a piece of soft wood with holes bored in it could be placed over some of the fingers on the machine side of the cut, so as to make the cut narrower and the work lighter. The covered portion of the knife would knock the crop down, but the return cut would gather it all up. Hay should be stooked as soon as possible after cutting. Long narrow stooks were to be recommended, and they should each contain from 25 to 40 sheaves. If the hay were somewhat green the stook should be only three sheaves wide, but with riper hay it should be four sheaves wide. The stooks should be given sufficient slope to prevent them from being blown down; this would also allow of better ventilation along the bases of the sheaves. In discussing the paper, Mr. J. H. McCallum favored a binder with a "tripper," so that the driver could release the sheaves at will. Spare parts should be kept on hand, so that no loss of time would be occasioned by breakages. Mr. D. E. Greig said that when parts of the machine were not working properly they should be thoroughly cleaned and oiled before adjustments of the machinery were made. Mr. D. W. cleaned and oiled before adjustments of the machinery were made. Mr. D. W. McCallum said that it was a mistake to continue to work over-worn parts. Mr. A. Gray thought that fingers of binders could with advantage be placed closer together than was usually done. The finger bar should be the lowest part of the machine, so that the knife could be lowered without fear of damage from any obstruction.

WILMINGTON (Average annual rainfall, 18.26in.).
September 23rd.—Present: 16 members.

FEEDING Horses.—A short paper was read by Mr. J. F. A. Zimmermann, who stated that his horses, which had been working hard, had done well on the following rations:—Morning—Two parts straw chaff, damped with molasses, with one part hay chaff, and a sprinkling of bran added. Midday—Same feed, with the addition of pollard and oil cake. Evening—Straw, in quantity as for morning, mixed with about one-eighth of a bottle of raw linseed oil. Night—Straw and chaff as before, damped with molasses, and half a lb. of table salt. The weight of the daily rations for each day was about 30lbs. Once weekly 4lb. of saltpetre was distributed between eight horses; and each horse was given half a packet of Epsom salts once weekly.

NARRIDY, September 25th.—The Hon. Secretary (Mr. J. Darley) contributed a paper dealing with the subject of agricultural labor.

ORROROO.—At the invitation of the manager of Murphy, Fromen, & Co., members recently visited their butter factory at Orroroo and were shown over by Mr. Burton (the manager). An inspection was made of the testing-room, churning-room, machinery, &c., and afterwards the different grades of butter were sampled. Mr. Burton demonstrated how the testing of cream was conducted in order to determine the quantity of butter per can.

WEPOWIE, October 18th.—Mr. C. Pearce read an extract from the Journal regarding "Conservation of Fodder."

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BOOLEROO CENTRE (Average annual rainfall, 15.83in.). September 17th.—Present: 16 members and four visitors.

SUPERPHOSPHATE AND ITS ACTION ON THE SOIL.—A paper on this subject was read by Mr. J. Carey, jun. He said:—''Moisture is of the first importance to plant life, and its conservation in the soil for profitable employment is a leading feature of successful agriculture. The food of plants consists of water, carbonic acid gas, ammonia, and other saline and mineral matters. This food is taken up

The air always contains a certain partly by the leaves and partly by the roots. amount of carbonic acid gas and ammonia which is carried down to earth by the rainfall. The rain sinks down into the earth, taking with it all soluble animal or vegetable matter it may meet with on the surface, together with any soluble mineral or saline matter which may exist in the soil. This forms the sap of the mineral or saline matter which may exist in the soil. This forms the sap of the plant. It has been found that 95 per cent. of plant growth is derived from the atmosphere, and only 5 per cent. of plant growth is derived from other sources of nourishment. All soils contain a certain amount of phosphate, and the action of the super. on the phosphate in the soil is to cause it to become easily soluble, and thus quickly available to the plant as a food. Superphosphate, as we know, is very valuable in getting the young plants away quickly, and thus giving it a start over the weeds; it promotes a vigorous early growth, and thus enables the wheat plant to take a good hold of the ground before the cold weather sets in. grower means a vigorous feeder, and thus the stimulating effect on the wheat plant by the superphosphate enables it to take more food from the land than it could possibly do under natural conditions. Because superphosphate forces the growth of the plant at the start, some people contend that it leaves the ground in a poorer All manures are not alike in their action on the soil. Manures act condition. in two wavs—they may supply food to the ground, or they may act chemically on plant food already in the ground. Professor Lowrie has said that the soil in this district is not deficient in lime. Lime helps to reduce all kinds of vegetable matter to humus; it also helps to sweeten the land, it makes it more porous and warmer, Our soils are deficient in phosphoric acid, hence thus increasing its fertility. superphosphate should always be used in greater quantities than the crops require in order to put into the land the whole of the phosphoric acid taken out by the I favor from 75lbs, to lewt, of superphosphate to be sown in this district. A crop of 20 bush, will take out of the soil 91bs, to 10 lbs, of phosphoric acid. 1001bs. of 36/38 per cent. super. we apply 171bs. of phosphoric acid, so that, supposing only 56lbs, is used, we put back into the soil only the quantity that a 17bush. crop takes out." Members discussed the paper at length, and emphasized the value of conducting experiments on the farm.

CRYSTAL BROOK (Average annual rainfall, 15.62in.). September 25th.—Present: 25 members and one visitor.

In the afternoon a large number of members and visitors inspected the local experimental plots. The opinion was expressed that, while the plots were looking well the varieties were too late for the best results to be obtained. In the evening further discussion took place on the subject of experimental work. Mr. Hutchison reported that he had experimented with the use of crushed shells applied to the land with good results. Mr. Shaw referred to the value of experimental work in the direction of selecting or crossbreeding varieties of wheat which suited the condition prevailing in their district. Mr. J. Teakle mentioned the necessity for keeping proper records of conditions affecting the experiments undertaken. Mr. Dennis said he had used shells on grass land, and a great improvement had been effected in the pasture. Messrs. B. Weston, Sutcliffe, Robinson, and Venning also spoke in support of the value of experimental work conducted by the Bureau.

MOUNT BRYAN EAST (Average annual rainfall, 16in.). September 25th.—Present: eight members and one visitor.

Mr. R. Thomas read a paper on "The Convenient Arrangement of the Farm." He said that in laying out a farm one of the important considerations was the water supply. A dam should be made, and if conditions permitted, it should be located so that the water could by gravitation supply the stables and garden. The stables should be so situated that the water could be drained away. Trees should be planted on the property, and a patch of good land selected for a vegetable garden; this would probably require heavy applications of stable manure to attain success. The paddocks should be laid out in such a way that a minimum of fencing would suffice; grazing land should be fenced separately from cultivated land, and should be supplied in convenient positions with good, strong gates. For sheep paddocks, special fences should be erected which would absolutely ensure that the sheep could not escape; a six-wire fence with iron droppers was to be recommended. A blacksmith's shop on the farm would be found a great convenience, and it should be erected so as to permit of work being done in wet weather; a great deal of useful work could be done in this shop resulting in a saving of time

and money. With a little experience, the sharpening of picks, pointing of plough shares, shoeing of horses, &c., could be undertaken by the farmer. The shop should be fitted with forge and anvil, bench, vice, drilling machine, grindstone, and such other tools as might be necessary. A carpenter's shop was also very useful, as an average farmer could easily undertake a great number of rough carpentering jobs with success. The shop should be provided with a bench and screw, hand and tenon saws, hammer, set square, spirit level, chisels, cramp, marking gauge, jack and smoothing planes, rule, brace and bits. Sheds should be fitted with sliding doors in preference to swinging doors, as they took up less room, and were less troublesome in boisterous weather. Discussion followed. Mr. J. Thomas tabled a fine sample of lucerne which was about a foot high, sown in April.

MUNDOORA (Average annual rainfall, 14.11in.). September 20th.—Present: 10 members.

Mr. J. Clothier contributed a paper in which he made suggestions for dealing with a crop of 400 acres. He said that 40 acres of the dirtiest of the crop should be cut for hay; this area should yield 60 tons. Another 40 acres of the best should be cut for heading, and should yield 50 tons of straw, as well as the average quantity of grain. Of the remaining area, 120 acres of the least promising could be reaped with the stripper, and should provide 13 tons of cocky chaff. The remaining 200 acres could be reaped with the harvester. On a basis of a four-bag average, a total harvest of 1,440 bags of grain, and also 123 tons of feed would be secured. Mr. H. Stephenson also contributed a paper. He said that with the present prospects there should be no difficulty in securing an abundant supply of hay. Where wild oats were plentiful, a quantity should be cut and stacked for emer-Where a farm was sufficiently clear, a great portion of the crop should be cut with the binder, and thrashed. By doing this, a great deal of loss caused by the crop going down or shaking out, could be avoided. Mr. Stephenson described the construction of a header attachment which could be fitted to a harvester. and which would produce a good sample of headed straw. This straw, when chaffed, would keep horses in condition, provided they were not working very hard. In the discussion which ensued, Mr. Wilson viewed with disfavor the practice of heading, on account of the extra labor involved, and Mr. E. Button supported his view. Mr. C. H. Button thought the heading method was to be commended in view of the extra straw and chaff which could be obtained. Members generally supported extra straw and chaff which could be obtained. Members generally supported cutting and heading where the ground was suitable to the use of the binder. Marshall's No. 3 wheat was recommended for heading on account of the brittle quality of the stalk.

> PORT PIRIE (Average annual rainfall, 13.21in.). August 21st.—Present: seven members.

Fodder Conservation.—Mr. F. A. Johns read a paper, in which he referred to hay as the chief means of conserving fodder. When the crop was being cut he thought it best to make the sheaves as large as the binder would tie without being too hard on the machine. Fairly large stooks should be made a day behind the binder. A layer of timber, with a coating of old straw should form the foundation for the stack. The method he adopted in stacking was then described. In the light of past experience, it was wise to save cocky chaff, which was best placed in a shed, or heaped in the paddock and covered with loose straw. If weights, such as rails were put on to this it would probably be found that water would accumulate. Straw should also be kept, and barley and oats grown. The manufacture of ensilage to provide feed for dairy cows, should not be neglected.

PORT PIRIE (Average annual rainfall, 13.21in.). September 16th.—Present: seven members and visitors.

STOCK-GARRYING CAPACITY OF FARMS.—In a paper with this title, Mr. E. B. Welch said the stock-carrying capacity of farms could be increased by the adoption of hand feeding at certain periods of the year, and the growing of forage crops. The sowing of barley on stubble land was to be recommended; the green barley had a high feeding value, and was much relished by stock. The conservation of straw was another important matter; he believed it would be profitable to cut the wheat crops with the binder, and thresh them. Peas could be grown with advantage; the grain was very fattening to sheep, lambs, and pigs, and the straw was good feed for cattle. Peas were particularly valuable as a feed for pigs. The present

outlook undoubtedly indicated that the keeping of all classes of stock could be undertaken with very profitable results. A good discussion ensued. The meeting was held at Mr. Welch's homestead, and members took the opportunity of making an inspection of the crops on the property.

WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

September 18th.—Present: seven members.

Fallowing.—In a paper on this topic Mr. F. Hunt said the main objects of fallowing were the conservation of soil moisture and the eradication of weeds. To obtain the best results, early fallowing was essential. The selection of suitable implements, such as the plough, was of some importance. Where a farm included different classes of soils, it might be necessary to employ more than one type of plough. Skim ploughs were well suited to the fallowing of light soils, but for heavy soils a strong and heavy implement would be required. Disk ploughs also were very suitable for certain classes of soil. The work of the ploughs should be carefully examined to ensure that the cultivation was being done efficiently. The depth of ploughing to be recommended for their distriet would vary from 3in. to 6in., according to the class of soil, and it remained for the individual farmer to study the soil on his holding, and to decide the most suitable depth for ploughing. Their aim should be to increase the efficiency of their farms, and thorough fallowing would have a considerable influence in that direction. In discussing the paper, Mr. Jenkins said that skim ploughing might be successful in dry seasons, but in wet years he would recommend ploughing to a depth of 5in. in stiff ground. Messrs. Green, Mitchell, and Mudge also spoke.

> YONGALA VALE (Average annual rainfall, 13in, to 14in,). October 25th.—Present: 11 members.

COCKY CHAFF AND STRAW .- In a short paper Mr. Battersby described a method of constructing a bin to hold cocky chaff. The structure was made 15ft. by 30ft., and was composed of posts wired up and supporting wire netting. chaff had been trampled down in this, it could be covered with straw. After the straw (preferably oaten) cut and bound, was preferable to cocky chaff for horse Salt should be added to straw when it was being stacked. A paper was also contributed by Mr. T. Miller. He laid stress on the wisdom of having all machinery, &c., in readiness to start work, and, in addition, having on hand the necessary supplies for repairing likely breakages. Sidelines such as cows, pigs, sheep, and fowls should also receive attention. Thirty or 40 acres could be put in for oats or barley for early green feed for the stock. Cocky chaff and straw should be saved as a means of tiding stock over periods of shortage.

NORTH BOOBOROWIE, August 18th.—The Government Veterinary Lecturer (Mr. F. E. Place) gave a demonstration at the Booborowie Experimental Farm in the afternoon and a lecture in the evening in the presence of nine members and 100 visitors. September 22nd.—A demonstration in woolclassing was given by the Wool Instructor (Mr. Henshaw Jackson).

SPALDING, September 17th.—Mr. E. E. Gill tabled samples of Rhodes grass which had withstood the effects of the drought without any water in addition to the rainfall. Mr. A. B. Jones initiated a discussion on "humus," and the value of returning organic matter to the soil. Reference was made to the practice of growing fodder crops, such as peas, in this connection, and also to the good effect of heavy applications of farmyard manure. The methods of conserving and distribution of the latter were also discussed.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

CLARE (Average annual rainfall, 24.30in.). September 17th.—Present: 15 members.

BEES AND THEIR MANAGEMENT.—This was the subject of a paper contributed by Mr. W. J. Maynard. He said that bee-keeping had not received general attention

Considerable success had been attained where bees had been in their district. kept, but the industry had in very few cases been given systematic attention. the hills around Adelaide and in the South-East much more had been done than in their district. Experience had shown that beginners with bees were remarkably successful for a time, but, frequently when the hives became numerous some disease broke out which destroyed the stock. From this it was evident that climatic conditions were highly favorable, but that proper management was required to guard against disease. There had been sufficiently numerous instances of successful bee-keeping in the State to prove that an apiary would pay for good management, and that a proper system alone was needed to render it highly profitable. The east was the most favorable aspect for boxes and hives; but it could be varied according to the season. The arrangement of hives should be in a line or singly under trees; hives should never be set upon benches close together, as the bees would be continually quarrelling and interfering with one another; the hives should be within 4in. to 6in. of the ground, and have the alighting board reaching down thereto, so that if a bee happened to fall on the ground it could reach the hive. The place for fixing the stand should be dry sandy soil preferably; it should slope toward the front in order to carry off the surface rain water, and should not on any account be exposed to drippings of sheds or houses. Bees required shelter, especially from the rear and on the east of the hives. Whatever trees were planted for shelter should be of low size with bushy heads in order that the swarms which Sites near noisy places or the stable settled on them might be more easily hived. The hives should be situated near a stream, but if or pigsty should be avoided. this was not possible shallow pans of water should be placed within reach of the The entrance of the hive should be clear of all shrubs and trees so that the bees might reach the hive without any difficulty. There were a great many kinds of hives, but the bee-keeper who looked for profit from his apiary was chiefly interested in the movable frame hive. The plain box hive served the purpose fairly well where only a few bees were kept, but the movable frame hive was the best in When boxes were used they should not be too large nor yet too small, and not thin in material. The oil case suited the purpose very well; with double sides and top it kept the heat and cold out. The box should be clean and free from disagreeable odors. All, however, who wish to succeed in bee-keeping should adopt the modern frame hive, as its use tended to great economy. The comb was not destroyed in taking the honey, artificial comb could be used, and all departments of management were facilitated. Nothing was more offensive or more irritating to bees than the human breath, and therefore breathing upon them should at all times be carefully avoided; sudden jars or quick motions should also be obviated. It was a part of the nature of bees to gorge themselves with honey when alarmed, and when in that condition they rarely, if ever, stung unless pinched. If a colony proved unmanageable they should be given as much smoke as was necessary, and They should never be disturbed at night the side of the hive should be struck. when it was damp and chilly. With the movable frame hive the operation of taking the honey was very simple. The frames could be taken out at pleasure, the brood and brood comb saved, and the swarm generally left uninjured. honey could also be perfectly separated, and the swarm was not entirely robbed at one time, because as much comb could be left undisturbed as might be thought desirable according to the character of the season. With plain box hives the usual plan was to invert the box, place another the same size over it, close the entrance hole of the hives, drum on the bottom box until the queen and most of the bees had ascended into the upper one, when this should be substituted for the original, and the one containing the honey removed. Mr. Maynard described the appearance and functions of the worker, drone, and queen bees. In reply to questions he said that the black bees were the most vicious, and that it was a mistaken idea to suppose that the Italian bees did not sting. The average number of pounds of honey obtained annually from a healthy swarm was from 80lbs. to 100lbs., and the outlay was about 2s., without the cost of boxes. Hives should be placed at the outlay was about 2s., without the cost of boxes. Hives should be placed at least 6ft. apart. Ants did not affect a strong swarm of bees, as the latter would kill the ants as fast as they entered the hive. He recommended using ammonia Wax moth was the worst enemy to bee-keeping in the district, and the best action to take once the pest got in was to burn everything and start afresh.

NORTHFIELD (Average annual rainfall, 19in.). September 17th.—Present: nine members and one visitor.

Mr. A. Low read a paper on "The Breeding and Feeding of Cattle most suitable He had had experience in Scotland, mostly with pure for Butchering Purposes. Aberdeen Angus cattle. The animals, when true to type, were entirely black and hornless, with small heads, straight backs, deep, full bodies, very short legs, and carrying very good flesh. They matured very quickly, and produced meat of good quality. If good results were expected from breeding, careful selections of stocks. should be made, both of male and female animals. In Scotland stock bulls were generally selected when about nine months to 12 months old, and at that age they were handled and trained to be led, and were given daily exercise, as they were for the greater part of the year kept stabled. Pure-bred cows which were well fed usually produced strong, rich milk, and care had to be taken for the first few weeks that the calves did not have too much, otherwise various troubles would ensue. After a few weeks, the calf would be able to take all the milk, and later the cow would require special feeding in order to keep her in condition and to maintain the flow The practice in Scotland was to secure the calf early in the year-January, February, or March. At that period of the year the cows were stall fed on turnips and oaten straw, and as the calf grew, an addition was made to the cow's feed of a few pounds of grain, linseed cake, and often molasses. May they were turned out to good grass, and when natural feed was scarce, resort was again made to hand feeding. Peas, tares, beans, &c., were cut and carted for the cattle, and they were also given a feed of grains and cotton cake once a Cattle for the butcher were fed mainly on these lines, but the young stock did not receive the same attention. Mr. Low answered a number of questions put to him by members.

TWO WELLS (Average annual rainfall, 16.36in.). September 21st.—Present: eight members.

Homestead Meeting.—The meeting was held at the homestead of Mr. Pratt, and the afternoon was spent in an inspection of the farm, crops and experimental plots, pigs, and the flower and vegetable gardens. In the evening, the Hon. Secretary (Mr. H. W. Kenner) contributed a paper on "The Growing of Early and Summer Feed." He said that farmers, in average seasons, experienced difficulty in feeding their ewes and lambs, which if put on grass land, kept the feed down when it was starting growth, and prevented the production of a big bulk of grass. area of fodder crop, such as a mixture of rape, mustard, oats and barley would be of considerable assistance on such occasions. The seed should be sown in, say, the second week of March, or earlier, according to rainfall, and the sheep should be put on when the crop was 6in. to 8in. high, at which time the rape and mustard should be fairly well grown, and would be relished by stock. This would enable the natural pasture to make headway. Milking cows would do well on such a fodder mixture, producing large quantities of milk of high quality. Rape, however, when in seed, would have a tendency to flavor butter made from the milk of cows A mixture of the following in the quantities stated would be found a satisfactory seeding per acre: -Rape 6lbs., mustard 2lbs., oats 20lbs., barley 25lbs. In some cases he noticed that the stock avoided the mustard, and therefore had recently included an extra 2lbs. of rape in its stead. Care should be exercised to prevent the "blowing" of poor and hungry stock when put on to such feed, allowing them to remain for a very short time only until their condition improved. Small paddocks were necessary for the successful feeding of such crops. barley, of course, could be sown with the drill, and if a grass seeder were attached to the drill that should be used for the rape seed; failing that the seed could be broadcasted. Field peas had a very high value as a summer fodder, and they possessed the advantage of enriching the nitrogen content of the soil. millet and sorghum, also, were excellent summer fodders. He considered that farmers could with advantage develop this branch of the industry in the near He considered that future in view of the present condition of the stock markets.

TWO WELLS, October 18th.—Mr. G. M. Cordon gave an account of the condition of crops in the Middle North districts, and stated that the "wild turnip" was very plentiful in some localities. He urged members to exterminate all such plants which might be found on their farms.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

KADINA (Average annual rainfall, 15.88in.).
October 15th.—Present: Five members.

Care of Harness.—In a paper on this topic Mr. P. D. Anderson suggested that farmers should collect their harness twice a year—say before seeding and before harvesting—and give it a thorough dressing with a mixture of neatsfoot oil and mutton fat. This application would preserve the harness. Such a dressing was preferable to dipping the harness in oil, as was sometimes done. Winkers, reins, etc., should be hung on a nail or hook when not in use, and a rail should be provided for the collars. Care should be taken to set the latter straight on the rail, otherwise there would be a tendency for them to lose their shape. It was best to have a room set apart for harness, so that it could be protected from the effects of the sun and weather. The harness should be periodically examined for defects, as accidents could often be avoided by so doing. A good discussion followed.

MAITLAND (Average annual rainfall, 20.08in.).
October 2nd.—Present: 10 members.

FIREBREAKS.—In a paper with this title Mr. H. Bawden said that, in view of the abundance of crops, grass, and other herbage, there would be a great danger in the summer months of the occurrence of serious fires. Apart from other damage, such fires would cause the destruction of large areas of valuable feed. He thought that farmers should take more than ordinary trouble in the provision of firebreaks. They should be ploughed to a width of at least 10ft., and should be occasionally harrowed in order to remove any grass, straw, or litter which might have collected on them. Some discussion ensued, and reference was made to the necessity for great care being exercised by smokers to prevent the starting of fires.

DOWLINGVILLE.—DRIFT.—A discussion on this subject took place. Members recommended that the land should be left in a rough state in order to prevent drift.

MOONTA, September 18th.—Mr. W. Alpin contributed a paper on "Essential Plant Food in the Soil, and how to Preserve it."

MOONTA, October 23rd.—Mr. W. F. Orloff introduced a discussion on the question of weeds. He referred to the prevalence of wild turnip, and thought some action should be taken to combat it. It was decided to make representations to the district council concerning the matter.

WESTERN DISTRICT.

COORABIE (Average annual rainfall, 11in. to 12in.). September 18th.—Present: 17 members and five visitors.

HAYMAKING.—Mr. J. H. Murray read a paper on this subject. He said that for hay production a piece of land should be chosen which was uniform throughout, and also free from stumps and stones. It should, if possible, be fallowed to a depth of 3in. or tin. as soon as possible after the conclusion of seeding operations, and in order to obtain a finely tilled firm seedbed it should be harrowed with a set harrow, and the harrowing should be repeated after every good rain in order to conserve all moisture possible. Provided the land was in a satisfactory condition, the seed should be drilled in not later than the second or third week in April. He suggested sowing 40lbs. of Rattling Jack wheat with 20lbs. of Algerian oats, together with 60lbs. of superphosphate, to the acre. For earlier cutting, a mixture of King's Early wheat and Calcutta Cape oats could be sown. For pure oaten hay, the oats would require to be sown very early in their district. For wheaten hay, such varieties as King's Early, Big Bull Head, Smart's Pioneer, and Steinwedel were to be recommended. After the crop was well up it should be harrowed. The time for cutting hay was 10 to 12 days after the wheat was in full bloom, just as the grain was entering the dough stage.

Stooking should be done almost immediately after cutting, and the stooks should not be made more than four sheaves wide. The stooks should be well built, and allowed to stand for a fortnight before being carted to the stack. The floor of the stack could be composed of large stones placed together, or of good stout timber—the former preferably. Stacking should be completed as quickly as possible to prevent the hay becoming damp before the building was completed. Square cornered stacks should be built if the stack-builder were experienced, but the round-cornered stack was more easily built by an inexperienced man. In stacking, every sheaf should be carefully placed with the butts straight. When the first outside row was completed, the inside should be filled up, reversing the sheaves, placing them with the butts inwards and the heads to the binds of the first row, and this should be continued until the layer was complete, care being taken to have the centre a little higher than the outside edge. Each layer should be made in the same way until the roof was reached. The first layer of the roof would form the cave, and the sheaves should be placed, butts outward, with the bind on the edge of the underlying layer, the centre still being kept higher than the outside of the layer. The second layer of the roof should be commenced with the butts of the sheaves resting on the binds of the first layer, and this should be repeated until the roof was completed. He recommended covering the stack to a depth of 1ft. with the straw, which should be held in position by wire-netting, which could be secured by pushing sticks through the edges and tying the sticks together with binder twine. In discussing the paper, Mr. Giles said he would allow the hay to remain stooked for three weeks before carting. In regard to preparation of the land, he warned members against overworking light land and causing drift. Mr. Riddle favored the frequent use of the harrows on the finer class of land in the district. In reply to a question, Mr. Murray advised making stooks 3 or 4 yards long. Some discussion ensued on the thatching of hay stacks. The general opinion was in favor of sheaved straw for the purpose.

AGRICULTURAL SHOW.—The members unanimously resolved that an Agricultural Show should be held at Coorabie during either September or October.

ELBOW HILL (Average annual rainfall, 11in. to 12in.). September 18th.—Present: five members.

Dairying on the Farm.—In a paper on this subject, Mr. F. T. Freeth referred to the need for proper supervision of all dairying premises from which products were marketed or sold. Milking bails should be well paved and thoroughly drained, and the dairying utensils should be kept in a suitable building, which should be well ventilated. In this building accommodation should be available for the separator, cream, butter, churn, and milking buckets, &c. The washing of the cow's udder prior to milking was of the first importance; regular milking was also to be recommended. He would recommend the Shorthorn breed for any localities where a certain amount of hardship would have to be endured by the cows. The Jersey was a good breed, but required sheltered conditions. The value of careful testing of milk could not be over estimated in that it showed accurately the productive value of each cow. In the selection of a sire due consideration should be given to the productive capacity of his female ancestry. Mr. Freeth concluded by referring to the Government scheme for the improvement of dairy stock by the supply of bulls of good quality.

GOODE (Average annual rainfall, 12in. to 13in.).

September 23rd.—Present: 14 members and four visitors.

Homestead Meeting.—The meeting was held at the homestead of Mr. A. Stasinowsky, and an inspection of his farm was made by the visitors, who noticed good crops and abundant feed. Mr. Tainsh said that when rust made its appearance in a crop it was best to cut as much of the crop as possible with the binder. Mr. W. Folland advised members to study the different varieties of wheat grown on their farms, and to preserve seed of those which promised to yield well. Mr. Stasinowsky referred to the possibility of co-operation among farmers in the direction of harvesting crops, in view of the shortage of labor.

Mr. Tonkin suggested that wheat cleaning could be expedited if members co-operated in the purchase of a motor winnower. Care should be taken not to put

new wheat on to a floor where old wheat was lying, as the risk of introducing weevil would be very great. Mr. Stephenson said that much valuable time would be saved during harvest time if farmers would thoroughly overhaul their machinery and see that it was in proper working order, also that all bags were in good condition.

KOPPIO (Average annual rainfall, 22.40in.). September 22nd.—Present: Eight members.

FALLOWING.—Mr. W. R. Richardson read a paper on this subject. He said that owing to the heavy rainfall in their district during the months of June, July, and August, it was often a matter of difficulty to proceed with fallowing operations as farmers would like to, but it was necessary, in order to make provision for the next year's crop, that they should fallow as large an area as possible. There was no reason why they should have all bare fallow, as there was a sufficient rainfall to enable them to grow a fallow crop without detriment to the following grain crop. The advantages of fallowing were the conservation of moisture in the soil, which enabled the fermion of the soil of the soil of the fermion of the soil of the ments to maintain their activity, to multiply and to break down organic matter into plant food. There were constant changes going on in the soil due to the activity of these ferments, which increased in activity when aided by moisture and warmth. The eradication of weeds and improvement in the physical condition of the soil, which assisted in the production of good crops and reduction of work at seeding time. This was important, as frequently there was only a short period when the land was in really good condition for working. Once the heavy winter rains set in, the ground became wet and cold, and the young plant did not secure a good start. May was the best month in which to sow, and if seeding could be completed during that month, more even crops would result. Fallowing should be commenced immediately after seeding, and generally a considerable area could be done before the land became waterlogged. Low-lying places should be cultivated first if possible. It was better to plough wherever possible, even if it had to be done in patches. The plough should turn the land over well to put the grass and rubbish well underneath. If this were not done it would only stimulate the growth of the weeds. Green growth well turned in acted as a valuable agent in returning organic matter to the soil. The depth of ploughing should vary with the quality of the land—say 3in. on some of the lighter gravelly soils and deeper where the land was of a more loamy nature. If it were possible to use set harrows he would do so, as stump-jump harrows were practically useless from the point of view of cultivation. He preferred a spring-tine implement which was of light draught and stirred up the soil well. If the fallow were worked in the spring and the weeds killed and allowed to remain in a loose condition, another working ahead of the drill would be found sufficient. It was better not to fallow when the land was in a very wet condition, as it was sure to bake hard and require a great deal of subsequent working to reduce the soil to a good tilth. It was better to satisfactorily treat a small area than to scratch over a large acreage. For a fallow crop he would recommend peas; they provided a good bulk of feed and exercise a beneficial influence on the soil. The chairman (Mr. J. Newell) opined that turnips, sown on early fallow, would provide good feed. The meeting was of opinion that fallow land would require thorough working in order to combat the weeds, which were becoming a serious menace in the district.

Mr. C. Barraud tabled samples of turnips and rape of exceptionally fine growth.

MITCHELL.

October 16th.—Present: 11 members and four visitors.

Fencing.—Mr. Jericho read a paper on this topic. He said that the best timber for fencing posts in their locality was the swamp ti-tree; the black ti-tree and pine also made good posts. Pine posts should be cut and allowed to dry before being put in the ground. The height of a fence should not be less than 3ft. 6in., and if a barbed wire were placed on the top of the fence, it should be 3in. or 4in. higher, to prevent stock from reaching over. Posts should be placed 20in. in the

ground, and strainers 3ft. 6in. The fence should consist of six wires, 6in. being allowed for the three lower spaces, and for the other three, 7in., 8in., and 9in. The barbed wire should be fixed to the tops of the posts, as that would prevent stock rubbing on the posts. If two barbed wires were used they should be the top two wires. Posts should be not less than 3in. in diameter at the smaller end. Where iron posts were used, barbed wire should be gauge 12. Plain wires should be gauge 10 if galvanized, or No. 8 if black. Only iron posts of the heaviest quality should be used. Posts should not be more than 5yds. apart, and wires should be kept tightly strained. In discussing the paper, Mr. Jenkins said that pine posts were of little value unless split and charred. Mr. S. Baker said that posts should be put more than 20in. into the ground, otherwise they were liable to be pushed out by stock. Members generally favored swamp ti-tree for posts.

PENONG (Average annual rainfall, 11.93in.).

October 9th .- Present: Eight members. CEREALS UNDER CROP IN THE DISTRICT .- A discussion on this subject was initiated by Mr. J. C. Stiggants. He exhibited samples of Indian Runner, Fairbank, and Gluyas wheats. Indian Runner, though grown on poor soil and without the aid of superphosphates, showed good height, color, and flag. He recommended it as a hay wheat. Fairbank, an early variety, had shown a tendency to go down as the result of recent heavy winds. Mr. Stiggants also tabled samples of "wild turnip" and what appeared to be wild radish. These weeds had appeared in the district since the advent of chaff from Tasmania early in the year. A magnificent bunch of oats caused some comment. Apparently the bunch had grown from a single grain. It contained 131 straws. Mr. J. Oats showed samples of Fairbank, Smart's Pioneer, Thew, and Bayah-all early varieties. Fairbank had gone down badly. Smart's showed a large head, well filled, although red rust had affected the flag. Mr. Oats stated that Bayah—a new variety of wheat in the district—was easy to reap and thrash, and stood well, but it was badly affected by rust. Thew was strongly recommended, as it had all the advantages of Bayah, but was not seriously affected by rust. The chairman tabled samples of Gluyas and Federation. During 15 years' experience he had found Gluyas to be the wheat best suited to the soil of his farm. The sample of Federation was blighted—probably due to severe winds. The secretary (Mr. O. J. Murphy) advocated the growing of barley, and showed samples of English malting barley and Cape barley. It was pointed out that barley was apparently not subject to rust, that it was a crop well suited to the sandy soils of the district, and gave bigger returns than wheat, and that the stubble was valuable as stock feed, especially in times of scarcity. Objections were raised to barley-growing by some members on account of the difficulty of cleaning it if only the stripper and hand winnower were available; also on account of the fluctuating prices. The secretary also showed a sample of White Tuscan-a good hay wheat, having a fine straw and flag, and almost totally unaffected by red rust. White Tuscan had grown well on sandy soils even in the droughty years. Members did not favor it as a hay wheat for the district on account of its lateness.

WARROW.

September 25th.—Present: 14 members.

Kale.—Mr. W. Doudle contributed a short paper on this subject. He said that it was of first importance that the paddocks intended for kale growing should be en-The land should also be cleared, as far as possible, of all tirely free of rabbits. broombush and mallee, otherwise the best results could not be expected. found that kale did really well on heath land, sandy or gravel land, where there was a clay subsoil. Quarter of a pound of seed to the acre should be sown, drilled in with the wheat or superphosphate, and with good rains in November, a good growth of kale in the early summer months was assured. It should be allowed to become well established before commencing to feed it off; when attacked by blight it should be immediately fed off. The growth in the second year would be found to be very satisfactory. He was of opinion that under present circumstances an area of kale carefully sown and fed off with stock, would give better returns than wheat growing on an equal area. Members discussed the paper, and advised sowing the crop on fallow ground, and also uttered a warning against sowing the seed too deeply.

YABMANA (Average annual rainfall, 15.14in.). September 25th.—Present: nine members and two visitors.

HAY.—In a paper on this subject, Mr. S. Pengilly said the most suitable wheats for hay in this district were Marshall's Hybrid, Marshall's No. 3, and Leatherhead. John Brown and Federation were not so good from a selling ståndpoint. He preferred building long, narrow stooks, when the crop was heavy and the hay was required to dry quickly. Much time and trouble would be saved when cutting if the land were rolled after cultivation. Members generally thought a good cut of hay was usually secured from Gluyas, which should be cut on the green side; if left until it became too ripe, the straw toughened.

GOODE.—Annual Social.—On the occasion of the annual social, held in Goode Hall on August 25th, a general invitation was extended to residents of the district, and approximately 150 persons attended. The Hon. Secretary (Mr. W. Folland) delivered an address giving a resume of the work done by the Branch during the year, and Mr. I. Will contributed a paper entitled "Why Farmers Should Take Interest in Agricultural Bureau Work."

GREEN PATCH, October 18th.—Further discussion took place in regard to the establishment of a butter factory to meet local requirements. At the conclusion of the meeting, a presentation of a case of silver-mounted pipes was made to the retiring Secretary (Mr. C. J. Whillas) in recognition of his services to the Branch.

SALT CREEK, September 25th.—Some discussion took place on the advantages of co-operative purchase of farm requirements. Wheatgrowing.—Mr. Gale suggested that members should take careful note of those varieties which were most susceptible to rust, so that they could be avoided in the future. Mr. Lee introduced a discussion on the value of superphosphate applications to the land. He said that farmers should record the results of different dressings.

WARROW, October 23rd.—Mr. H. Puckridge contributed a paper on rape. He said that it was an excellent fodder for sheep, and should be sown on fallow land early in the season, in order to enable it to secure a good start before the advent of the cold weather. It seemed to grow well on poor quality soil, and by grazing the crop, the land received the benefit of the droppings of the stock. Discussion followed the reading of the paper.

EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES.)

BERRI.

October 20th.—Present: 21 members.

FODDER CROPS.—Mr. T. L. Hughes read a short paper on this topic. He advocated placing 2 acres out of every 15 under fodder crops. Different crops should be sown in rotation, commencing with a mixture of oats and lucerne in February for early feed, and following with maize, millet, and sorghum, also carrots, melons, and pumpkins, but always having an appreciable area sown to lucerne. He laid stress on the necessity for heavy manuring in order to ensure the maximum return from a limited area. In discussing the subject, some members preferred wheat to oats for early green feed, whilst other members favored barley. Some supported the practice of sowing wheat and oats together.

BORRIKA.

September 18th.—Present: 12 members and eight visitors.

CONSTRUCTION OF FARM BUILDINGS.—Mr. Green contributed a paper on this subject. He suggested that in their district, where limestone was plentiful, it could be used as building stone, or if rubble only were available, this could be utilised for making concrete, with which walls could be built with the aid of boards. The dairy should be erected close to the back of the house, or a cellar should be excavated under the house for the purpose. Ample space should be left around the house for gardening purposes. Stables and sheds should be situated 4 or 5 chains away from the house, and by combining the implement shed, chaffhouse, and stables, considerable expense could be saved. The front of the stable should face the east, and

should provide accommodation for 14 or 15 horses. The yard should be the full length of the stable, and three-quarters of a chain wide, with a division fence in the centre, and a wide trough to give a supply of water in both yards. A stall 5ft. in width should be provided for each horse. One continuous manger should be made of flat iron, with a passage way along the back of the manger connecting with the chaffhouse. There should be a loose box at either end of the stable, as this would be found very convenient for enclosing young foals, sick horses, or for world the coltage of the stable of th catching colts. The implement shed should be 16ft. in width and the length of the The supporting posts in the front should be from 12ft. to 15ft. apart, so that there would be plenty of space to allow of implements being put away. chaffhouse should be at the end of the shed and stable, with a doorway into the latter, and the cutter should be located immediately outside the chaffhouse. If possible, the barn should be situated on the side of a rise; a sliding door should be provided at either end, one being level with the ground and the other on the level of the bottom of a wagon. This would be found a great convenience in loading heavy material. Another suggestion was to have the barn connected with the shed, with a door at both ends, so that a wagon could be driven right through. For burning lime, the excavation for the cellar could be utilised. It should be 8ft. long by 6ft. wide and 5ft. deep. A hole should be made at the bottom where it was intended to put the cellar steps, and this should be continued upwards, to be used for a firehole. The first layer of stones should be 3ft. in height, and this should be followed by 1ft. of roots or long wood, then 2ft. more of limestone, 6in. of wood, 1ft. of limestone, and 6in. of wood. This should be covered with a layer of fine rubble about an inch thick, and the sides should be banked up with about 4ft. of The fire should burn for 48 hours. In discussing the paper, Mr. Penfold thought stalls should be 6ft. wide, and he preferred to have sheds and stables separated in order to reduce the loss in case of fire. Messrs. Tonkin, Huxtable. Griffiths, and Gray also took part in the discussion.

BOWHILL (Average annual rainfall, 12in.).

September 25th.—Present: 17 members and five visitors. HAYMAKING.—Mr. G. A. Seidel read a paper on this subject. He said that a wheat crop badly affected with rust or smut should be cut for hay, as while this did not produce the best quality hay, it was the most profitable course to follow when faced with the possibility of a failure of the grain crop. Where the land was rough and covered with stones and rubbish, it should be first cleared as well as possible, so that the work of the binder should not be interfered with. Often, nowever, it was better to cut the hay with a mower, which was capable of working on much rougher land than the binder; in the latter case, the wheat should be cut when the grain was in the milky stage, as loose hay was usually fed to stock in that state, and was relished by them when slightly on the green side. It could be raked with a horserake immediately after cutting, although if the crop were very heavy, it should be allowed to lie for a few hours. On the succeeding day, the hay should be thrown up into cocks, care being taken to shake it well in the operation to rid it of all rubbish. For making chaff, oaten was preferable to wheaten hay. The latter, when intended for chaff, should be cut when the grain was formed after it had passed the milky stage. Oats should be cut when the crop presented a greenish-yellow color, when it was commencing to ripen. Before it was put into use the binder should be thoroughly examined to see that it was in good working order. Only the best twine should be used, as annoying and costly delay followed breakages caused by using inferior twine. Sheaves should be allowed to lie in the field for at least a day before being stooked. Stooks should be oblong in shape, and four sheaves in width, and if pressed closely together at the top, would sustain little damage from unfavorable weather. Calm weather was essential to the carting of loose hay, and as there was usually less wind in the early morning, it was advisable to commence work as early as possible. The centre should be kept higher than the sides. When the stack was 12ft. or 13ft. high carting should be ceased for a few days to allow the hay to settle down. On resuming, the roof should be commenced. The interior of the stack should first be built up, say, 3ft. higher than the edges, and the hay should then be stacked on the sides, drawing in each successive layer about 1ft., and keeping the centre still 3ft. above the sides until the ridge was completed. In the case of sheaved hay, the sheaves should be laid around the outside with the butts outward, the inside rows of sheaves being

placed with the heads outward. For a 30 to 35 ton stack of oaten hay, the dimensions should be 45ft. by 15ft.; the quantity to be carted could be gauged by the amount of twine used in tying the sheaves—a bale of twine would tie about 28 tons to 30 tons. Care should be taken not to place subsequent layers too far out, as there was a tendency for the sheaves to move slightly outwards. When the height of the stack approached 12ft. or 13ft., the sheaves should be made to overlap a little more in order to bring the centre of the stack somewhat higher. When commencing the roof, a row of sheaves should be placed to overhang the stack by between 6in. and 9in.; the inside rows should be placed, heads outward, with the heads level with the ties of the row beneath. The ridge of the stack should be finished off by laying sets of three sheaves lengthwise. These should be fastened down by driving pegs into the stack on either side of each set, and tying string from peg to peg across the sheaves.

CLANFIELD (Average annual rainfall, 16in. to 17in.). September 18th.—Present: nine members and five visitors.

MIXED FARMING.—In a paper with this title, Mr. A. Orwell said that as settlement in their district had increased to such an extent, mixed farming should be carried on more extensively. On a farm of, say, 1,000 acres, a rotation should be adopted which would each year allow one-third of the area to be cropped with cereals, one-third to be under bare fallow, and the remainder left out to Some small paddocks should be available for growing forage provide grass. erops, such as barley, lucerne, mangolds, and field carrots. A portion of the wheat crop should be cut with the binder and headed, so that the straw could be stacked for use in times of food scarcity. Three or four good mares should be kept and mated with the best available stallion, so that aged horses could should be said. always be replaced by young ones, and a number could also be sold. Sheep were a very valuable asset to the farm; they were very effective in keeping the land clear of weeds, and the returns for meat and wool should be very satis-It should be possible to keep 200 ewes on an average farm. Merino ewe crossed with the Lincoln ram would be found the most satisfactory Three good cows should be kept; he recommended the for general purposes. Jersey breed as good milk and butter producers. Pigs could be kept with advantage by feeding them with waste milk, mangolds, barley, &c. Poultry should also receive attention. White Wyandottes would, in his opinion, be found very satisfactory as good layers and table birds. A flower garden and a kitchen garden would also assist in making the farm life more pleasant and attractive. In discussing the paper, Mr. Hammett recommended sowing oats on stubble land to provide feed. Mr. Cockshell thought that farming in their district was not sufficiently advanced to permit of the adoption of a three-year Mr. Wilkins also supported this view. Fowls should be kept in an enclosure, as they did too much damage when allowed at large. think the district was suitable for sheep, and recommended thorough working of fallow to eradicate weeds. Messrs. F. and A. Moar also spoke. In reply to Mr. A. Orwell, Mr. F. Moar recommended the Gatton oat in preference to the Algerian variety for hay in their district.

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.). September 20th.—Present: seven members and two visitors.

BEST METHOD OF FARMING MALLEE COUNTRY.-Mr. M. Robinson read a paper on this subject, in which he said he would take for an example a farm 1,500 acres In the first year 500 acres should be rolled down, and after the "spring backs" had been cut and other preparation made, a good burn should be secured. Cultivation should be carried out in April after a good rain, and sowing should be He would recommend sowing 56lbs, seed and 80lbs, super. undertaken in May. per acre, harrowing before and after the drill. If a good crop were secured, a In the second year a further 250 very satisfactory stubble should be obtained. acres should be dealt with in a similar manner to the first 500, while of the latter, 250 acres should be sown with wheat, 200 with oats, and 50 acres left for feed. In the third year a further 250 acres should be cleared, and with the second area cleared, sown with wheat. Of the first 500 acres, 250 should be sown with oats at the rate of 36lbs. seed and 80lbs. super. per acre, and the balance should be bare fallowed, ploughing with a share plough to a depth of 2in. or 21in. in June and

July, cultivating in September and harrowing at the first opportunity. In the fourth year a further 250 acres should be rolled down and sown, together with the fallow portion of the first area and also the area cleared in the third year, the remainder being fallowed. In the fifth year the clearing would be completed, and a rotation could be adopted which would only require the land to carry a wheat crop every third year. The necessary work could be done by two men and 14 horses. Mr. Gray recommended the sowing of oats on sandhills. Mr. E. Colwill referred to the danger of a settler clearing more land than he could manage. The Hon. Secretary (Mr. D. McCornack) emphasized the value of utilising stubble land for feed by sowing barley after a burn in, say, February or March. This could, with advantage, be fed off by sheep. Mr. G. S. Small also spoke.

COONALPYN (Average annual rainfall, 17.49in.). October 22nd.—Present: 11 members and four visitors.

SHEEP ON THE FARM.—A paper on this topic was read by a visitor. The writer said that in making a purchase of sheep, farm-bred sheep should be selected, as they were quieter and more contented on small holdings than station-bred sheep. This applied more particularly when buying store sheep for fattening, as the quieter the sheep were, the quicker would they fatten. Overstocking should be avoided. Sheep required plenty of water in the hot weather; and it should be available to them at all times. It was better to keep a few sheep on the farm all the year round than to keep larger mobs for short periods of time. They were very effective in dealing with mallee shoots, and in clearing weeds from fallow land, at the same time manuring the land. They returned revenue from wool, and there was the advantage of having ration sheep on the farm. When ration sheep were being killed it was an advantage to have a fly-proof safe, say, 7ft. long by 3ft. 6in. wide, by 7ft. high, in which killing could be done, thus protecting the meat from flies. In the discussion which ensued, Mr. Whitehead said better results might be secured by buying a large flock of sheep, when feed was plentiful, and disposing of them at a favorable opportunity. Mr. Wall thought that station-bred sheep were more Mr. Pitman recommended the Merino breed of sheep. uniform in type. Hon. Secretary (Mr. F. J. Tregenza) said that the erection of the necessary fencing was the only obstacle to the general keeping of sheep all the year round. They would soon be essential as fallow cleaners.

Fallowing.—Mr. J. Colliver read a paper on this topic. The objects of fallowing, he said, were the æration of the soil, the conservation of moisture in the soil, and the clearing of the land of weeds. There were many other advantages, such as the improved physical condition of the soil, and prevention of diseases. The best time to fallow was in the months of June and July, but if it could not be done then, it should be done as soon as possible. The land should be subsequently harrowed after each appreciable fall of rain, in order to prevent the evaporation of moisture. The Hon. Secretary (Mr. F. J. Tregenza) emphasized the need for fallowing, more particularly in new soils, for æration and sweetening. Sand required less after working, but red clay could hardly be overworked. His ideal was to crop only fallow. Members agreed in regard to the necesity for carly

fallowing to prevent seeding of weed plants.

GERANIUM (Average annual rainfall, 16in. to 17in.). August 28th.—Present: 15 members.

QUESTION BOX.—Members asked whether late wheats were more subject than early varieties, to takeall. [The Director of Agriculture states that in a general way there is probably no difference in this connection.—Ed.] Also—(a) Whether feeding down crops lessened the quantity of smut thereon,; (b) whether barley was liable to takeall, to both of which the Director answered in the affirmative (c) Did it pay to work takeall out of the land, without growing oats? Members thought early fallowing, not too deep, and harrowing down within 10 days of ploughing, would be effective. [Professor Perkins states that the destruction of host plants, many of which are weeds, would eradicate takeall.—Ed.]

HALIDON.

September 15th.—Present: 10 members and one visitor.

Gardening in the Mallee.—A paper on this subject, written by Mr. L. A. Von Doussa, was read in his absence. The writer advocated the establishment of a kitchen garden on every farm where water was available. For the purpose, a piece

of land with soil of good quality should be selected and fenced, with netting wire or alternatively with a good broom fence. The latter had the advantage of serving A small, well protected portion of the garden should be set aside as a breakwind. for the raising of seedlings. Allowance should be made for one row of each variety, say about two yards long. The soil should be worked down to a fine tilth, and given a good dressing of well-rotted stable manure. Seeds should be sown after the first good rains in March or April. Planting out should be done as soon as the plants were large enough, on a dull day, and, if possible, just before rain. Care should be taken to allow the plants sufficient space, but they should not be planted too far apart, otherwise an excessive quantity of water would be required. Cabbages and cauliflowers should not be closer together than 18in.; root plants, such as beet, could be planted more closely, while a distance of 9in. would suffice between lettuces, turnips, and radishes. Turnip and radish seed should be broadcasted over small areas, sowing at intervals of a few weeks, so as to secure a con-The plants required to be thinned out to secure good results. tinuous supply. Carrots and parsnips should be planted in rows. Ground for all root crops required to be deeply cultivated in order to allow of root development. Silver beet was very easily grown, requiring little attention. Seed should be broadcasted, and the plants thinned out to 12in. apart. Peas should be sown at monthly intervals from April to September, in rows 18in. apart. The ground on either side of the plants should be banked up as the plants progressed. French beans, of the dwarf variety, should be sown in September, but they were not easy plants to grow. Melons of all descriptions grew excellently in mallee country. The seeds should be planted The beds should be well manured, and at least in round beds 18in. in diameter. 6ft. apart; three seeds were sufficient for each bed. Tomato plants should be planted out in September, and should be well protected from wind and frost until The best method of irrigating with bore water was to periodically flood the garden. With the vegetables planted in rows and trenches between the rows, provided the ground had a gentle slope, this method would prove very suc-Liquid manure should be applied at regular intervals to cabbages, cauliflowers, melons, and tomatoes in order to force their growth. A bag of cow, fowl, or pig manure should be left in a tub of water for a few days. This solution. diluted with more water, would produce very good results when applied to the plants named. The soil should be slightly damp before using liquid manure. The frequent mulching of the soil with stable manure materially assisted in the conservation of soil moisture. Mr. Russell, in discussing the paper, recommended sowing turnips in rows. Cauliflowers should have plenty of room, and should not be planted closer than 2ft. 6in. in the rows, and 3ft. between the rows. French beans could be grown successfully if the soil were properly prepared; the surface soil should be loose, and subsoil firm. To secure early tomatoes the seed should be sown in a box buried up to its surface in a manure heap. Mr. Bird and other members commented on the paper.

Fruit Trees.—In a paper on this subject, Mr. J. A. Hehir said that, in the preparation of land for fruit trees, the soil should be ploughed deeply, from Sin. to 12in.; the land should then be left idle for a few months, to allow of æration and sweetening. Before planting the trees, the land should again be thoroughly cultivated and finally harrowed. The best time to plant trees in their district would be from the beginning of July to the end of August. Holes should be dug deeply enough to take the tap root (if the tree had one), and to bury the surface roots with 4in. or 6in. of soil. The roots should be spread out as evenly as possible when planting. To successfully prune fruit trees, considerable experience was necessary. In reply to questions Mr. Hehir said he would not advise pruning fruit trees during the first year after planting. Land with limestone rubble subsoil should be very suitable. The Chairman (Mr. Weste) said that even if fruit trees were not profitable, it was an advantage to have a few growing around the homestead. Oranges were delicate trees, and difficult to grow successfully; lemons, however,

were much hardier. Mr. Muecke also commented on the paper.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.). September 24th.—Present: 21 members and three visitors.

RE-STOCKING OF FARMS.—The Hon. Secretary (Mr. C. F. Altmann) read a paper on this subject. In view of the shortage of livestock caused by the recent drought, he said it should be the duty of every farmer to re-stock his holding with

cattle and sheep as quickly as possible. Purchase of stock was very expensive, so he should have recourse to breeding. Mares fit for breeding should be utilised for this purpose; the same applied to cows and sheep. Lengthy discussion ensued.

MURRAY BRIDGE.

Sept. 20th.—Present: 14 members and six visitors. POTATO GROWING.—This subject was dealt with in an address by Mr. J. Pope, of the Mount Barker Branch, in which he gave a number of interesting facts. selection of reliable seed, he said, was one of the most important factors in potato Late kinds should not be planted early. A beginner should gain experience by starting with a small area, seeking the advice of practical men, and then gradually increasing the area. A large area at first might be a failure, and cause the grower to become disgusted with potato growing. Cultivation was as important as the selection of good seed. The land should be thoroughly well important as the selection of good seed. worked before planting the crop. Probably no crop responded so well as the potato to a change of seed. It was difficult to procure reliable seed, as imported seed was usually much bruised in transit, and there were then many misses in the rows. Many people make the mistake of selling the best, and planting what should be fed to the pigs. Mr. Pope advocated the use of whole seed from good stock, not small round seed, from weaklings. It was well to get a change from a drier With large seed it was necessary to plant one-third more, and there was the cost of cutting. If treated too tenderly the shoots were not hardy. well to expose the seed to the light and air, but it should be shaded by trees, and occasionally turned over with a shovel; that treatment induced strong, hardy shoots. The kinds he recommended for planting were:—Early—Carmen No. 1, Up-to-Date; Late—Excelsior, Snowflake. The distance between rows should be 2ft. Early kinds should be put nearer the surface, with the sets 15in. to 18in. apart. but later kinds deeper. Excessively damp soil would not do for potatoes. Good drainage was very important. He advised them to sow poor soil with peas, plough the crop in, and then plant potatoes. In the matter of fertilisers, he found that superphosphate gave the best results; or one-half super and half bonedust, used at the rate of about 4cwts. to 6cwts. per acre. In the interesting discussion that followed the address, Mr. Pope answered many questions which threw light on the

MYPOLONGA.

question of potato growing.

October 20th.—Present: 24 members and four visitors.

Mr. P. H. Pickering read a paper in which he urged farmers to study their methods more carefully with a view to making their farms more productive. The dairy herd should be thoroughly tested, and unprofitable cows dispensed with. It was far more profitable to keep a lesser number of good cows than a large number of indifferent animals, as the extra work involved in the latter case did not produce a corresponding return. An inferior or mongrel bull should never be used for breeding purposes, as he would only lower the standard of the herd. The matter of the sowing of different crops should have careful attention; the suitability of different classes of land should be taken into account in deciding where to sow various crops. Animals used for breeding purposes should be disposed of when they became aged. A great deal of extra work was often involved through badly planned buildings, yards, and paddocks. Gates should be periodically examined to see that they were capable of rendering efficient service. Buildings, paddocks, and yards should be rearranged, if by so doing it was thought that a saving of time could be effected.

NETHERTON.

September 25th.—Present: nine members.

Noxious Weeds.—In a paper with this title, Mr. L. Crouch said that it was incumbent upon every farmer in a new district to do all in his power to prevent the spread of troublesome weeds which were introduced from time to time. He referred, firstly, to the weed known as "wild turnip," which was very prevalent in the present season. The presence of this weed in the crops made it necessary to cut a great deal of wheat for hay; this would sell at a reduced price on that account. Another troublesome weed was that known as "Salvation Jane," which required early eradication, otherwise its rapid spread would present serious difficulties. Sorrel.

which he believed had already made its appearance in their district, would require constant attention if it were desired to avoid the serious trouble which would attend its spread. He urged every farmer to take the necessary steps to check and control these weeds. The subject was well discussed by members. Mr. Byerlee mentioned that in times of shortage in the North stock would eat "Salvation Jane," but despite this, he was of the opinion that it was wise to destroy the weed.

PINNAROO (Average annual rainfall, 16,74in.). September 24th.—Present: 26 members and two visitors.

LESSONS FROM THE DROUGHT.—In a paper on this topic, Mr. R. Edwards said that it behoved farmers, in view of their recent experiences, to be in a degree prepared for a repetition of drought conditions, so that the effects would not be so The consequences of a shortage of fodder were very drastic, and severely felt. they could be prevented to a great extent by avoiding the waste of cocky chaff and straw, which in such times had considerable value as foodstuffs. Cocky chaff should be heaped and covered with a thick layer of straw, or preferably, put in a shed or barn. A convenient way of storing it was to place it in an enclosure of small mesh wire netting, which could be supplied with a thatch roof. Good clean straw would be a valuable asset in times of scarcity, and a good quantity of it should Some could also be stacked in a loose conbe cut with the binder and stacked. dition in the paddocks. Sheaved straw, preferably oaten, should be stacked close to the haystack, whence it could be mixed with the hay when chaffing, as this was the best method of mixing the hay and straw for feeding purposes. He was convinced that excessive feeding was practised when foodstuffs were plentiful. Horses not working, or doing light work, could be fed with chaff containing 25 per cent. of straw. Molasses was a valuable addition to the inferior grades of fodder, as it was nourishing, and was relished by horses. The provision of a large quantity of hay was a matter of great importance, and if possible a two-years' supply should be kept on hand. It was also an advantage to have two years' requirements of seed wheat available, as a surplus could always be profitably disposed of. Such provisions, of course, would have to depend on the financial circumstances of the individual. Lucerne growing should be adopted wherever circumstances permitted, even if the quantity which could be grown were very small, as it had a certain medi-Maize, also, was a splendid summer fodder; it could be sown on cinal value. fallow land and with opportune late spring or early summer rains it would provide an appreciable bulk of fodder. There were also various grasses, for some of which drought-resisting properties were claimed. The manufacture of ensilage was well worth serious consideration, as a great deal of the natural herbage could Opportunities for the sale of surplus horse stock should be taken advantage of, as the feeding of unnecessary animals, more particularly when the price of feed was high, was distinctly unprofitable. Mr. A. H. Symonds, in commenting on the paper, advocated growing sorghum and Rhodes grass for fodder. Mr. Parsons said that if "cocky chaff" were protected with a good roof it would remain in good condition for a long period, and Messrs. Roper and Venning supported this view. Mr. Ledger thought it had a higher feeding value than straw. He had had experience in the making of ensilage, and would not recommend it to farmers unless they were prepared to make fairly large quantities; it was excellent fodder for dairy cattle. Mr. Venning advised cutting hay with the binder until the crop became mature, when the use of the header would provide a quantity of useful straw. During the afternoon members paid a visit to the homestead of Mr. F. H. Edwards, and spent an interesting time inspecting the cereal crops and large vegetable garden.

AMCO.

September 20th —Present: 10 members.

Manuring Orchards.—In a paper on this subject, Mr. Jackmann explained that he had in use a home-made manure distributor which he had found very effective for manuring orchard land. It consisted of a cultivator with a fertiliser attachment, so arranged that the manure was deposited in the furrows made by the cultivator tines. The manure could be sown at any depth up to 10in., at the rate of 3cwt. or 4cwt. per acre, and depositing it in rows, two between vines and four or six between fruit-trees, the distance between the rows being equal to the width of the cultivator. To make the machine, a part of the seedbox of an old seed-drill should be taken and six star feeders fixed therein, with

two tubes attached, each supplied by three of the star feeders. Connection between the tubes and the seedbox consisted of galvanised-iron, V-shaped. The tubes fitted into two hoes taken from an old seed-drill, and the hoes were bolted on to the back of the tines of the cultivator. To make the driving connections, a large bicycle driving wheel should be fixed on to the inside of the cultivatorwheel, and on to the square driving-bar of the feeders should be affixed another smaller sprocket-wheel. These two wheels should be connected with a bicycle chain, and the machine was then ready for work. The points of the hoes should be about 2in. lower than the furrowers, and the manure would be effectively sown, being covered in by a drag of light curved iron, say a used rim of a small plough wheel. The flow of the manure could be regulated by controlling the number of feeders contributing to each tube. If it were desired to sow the rows of manure closer together, an extra hoe could be affixed, connecting two instead of three feeders to each hoe. Messrs. Jones, Rogers, Stanley, and Lewis all testified to the efficiency of the machine, which would sow 10 acres per day when drawn by two horses, and the work which it did was very satisfactory to all who had used it.

> RENMARK (Average annual rainfall, 10.93in.). September 23rd.—Present: 14 members.

BUDDING FRUIT TREES.—In a paper with this title Mr. G. Agars gave some hints on the art of budding young trees in the nursery, and also trees in the orchard which had not been grafted successfully, and which had grown into trees. He said that while grafting might be practised on the latter he was of the opinion that budding would be the best way of working them over to the variety desired. To be successful with budding it was essential to see that the stocks to be operated on were in the proper condition, with the sap rising, and the young trees showing young growth at the top ends. The next thing was to secure good, well-matured buds from small branches or sticks of the current year's growth of the variety required. The operator should provide himself with a good sharp budding knife and some good material for ties, such as strips of old calico or linen, or in the case of citrus trees, strips of waxed calico. The lower limbs, or small branches, should be cut off with the secateurs, trimming the stocks up for a few inches above the ground so that they would not be obstructive when tying the newly inserted buds. with the knife, a horizontal cut should be made through the bark, about 2in. above the ground, care being taken to make it just above a nice smooth part of the bark. Another cut should then be made about an inch in length, straight down the stem, intersecting the other cut. The bark should be slightly raised at the corners where the two cuts intersected, care being taken not to raise it too much, but just sufficiently to admit of the lower end of the bud being inserted. The bud should be cut from the stick by making a cut about a quarter of an inch above the bud selected, and then turning the stick over, and starting a cut about half an inch below the bud in a slanting direction in order to cut under the bud without injuring it, leaving the bud with a small portion of wood adhering to it. The lower end of the bud should be inserted in the cut made in the stock, and gently pressed downwards with the point of the knife until the top of the bud was level with the cross cut in the stock; or if it could not be forced down so far without injury, it should be forced as far as possible, and the top or protruding portion of the bud cut off level with It was always well to make the bud force its own way under the the crosscut. bark, rather than open the cut on the stock excessively, as the bud would fit better and would be more likely to "take" than if put in loosely. When the bud was in position it should be bound up with a piece of tie, care being taken to put the tie on tightly and in such a way as not to cover up the eye of the bud. The best way was to put one turn round the top part first, and then bring the tie round at the back of the stem and round the bottom part of the bud, and then tie the ends to-The after care of buds was of great importance. Care also had to be taken that the ties were not left on too long, choking the buds, or that they were removed too soon before the wounded bark had properly healed. It was a safe rule to leave them for at least a fortnight, and in some cases three weeks, before loosing the There were two seasons of the year when trees could be successfully budded, summer and autumn. The former were known as summer buds, and the latter as dormant buds, i.e., buds that remained dormant after "taking" and did not burst into growth until the following spring. The latter, in his opinion, were the better, as they had the whole spring and summer in which to grow, while the summer buds

only grew during part of the summer, as they were generally put in about the end of November or beginning of December. Buds that were put in at this time of the year required to start growth as soon as possible, and to secure this, the top of the stock should be cut back and a small ring of bark taken out just above the bud, about a week after budding. This forced the sap into the buds, and started the growth. All suckers should be suppressed, or they would spoil the chances of the bud. Buds put in as dormant should have the stocks left intact until planted out in the following late winter or spring, when they were cut back and treated in the same way. His experience was that the dormant buds made by far the best trees. Much discussion ensued.

SHERLOCK (Average annual rainfall, 14in. to 15in.). September 21st.—Present: eight members and 16 visitors.

Mr. F. Norton, J.P., of the Geranium Branch, attended the meeting, and delivered an address outlining a suggested system for farming country of the type met with in their locality. He said that farmers should cultivate smaller areas and farm them better than was generally the rule; more attention should be devoted to clearing the land of stumps and bushes. Fallowing should be done earlier and better; graded seed should be used, and heavier applications of superphosphate This would produce more grass, and a greater number of stock could be He thought that, in the course of time, their country would be as productive as the older settled districts in the North, but before they could achieve the best results they would, of course, have to overcome natural disabilities. Clearing would have to be done thoroughly. Stumps required to be taken right out. only did these occupy a lot of ground, but they caused a great deal of damage to The natural advantages of the country were many; the sandy loam soil was easily worked, and retained the moisture well; practically all the rain which fell was absorbed by the soil. Mixed farming practice should be adopted. Fodder crops could be grown with advantage. He had been successful with mustard, kale, rape, berseem, lucerne, maize, millet, sorghum, peas, and Cape and malting barley; these crops were grown in fairly large areas under indifferent conditions. With favorable circumstances, there was no doubt that these fodders would do excellently, and they would enable sheep to be kept, and this was a very important item of the practice. Rhodes grass, Italian rye grass and evening primrose should also be successful. Sheep cleared the land of weeds, packed the soil, and fertilised the land, besides returning a direct profit in wool and progeny. Land for fodder crops should be prepared in March, and sown about the first week in April. He recommended dividing the cleared area into four parts, and following a rotation of fallow, wheat, cats, oats. In the second year, the wheat stubble should be burnt, and in the next March oats sown, and fed off with sheep; 100 acres should then be fenced off for hay, seed oats, and grain for stock, the balance being kept eaten down until September or even later in a wet year; the sheep should then be kept off until the last growth ripened, when it could be fed off. Sufficient grain would be left on the ground to seed the crop for the next year, and this should be harrowed in March, and fed down from time to time, and allowing the sheep to finally eat it right out in order to have the land thoroughly clean for the next year's fallow. After this the rotation could be repeated. Oats acted as a tonic to the soil, and did not constitute a host for the "takeall" fungus. Peas, rape, kale, or mustard could be substituted for oats, but the latter withstood rough conditions better, and were more easily handled and more generally understood. keeping of stock, the object should be to purchase in a cheap market and sell in a dear one, and fodder crops would assist to a great extent in carrying out this plan. The seeding of fodder crops should be commenced in March with oats, and completed about the middle of April with such crops as kale, rape, or mustard. It was not sufficient to only grow fodders, but it was also necessary to conserve feed in the form of hay, grain, and also ensilage. There were a number of maxims which should be observed in caring for stock, such as variation in feed and balance of rations, shelter, pure water, provision of licks, and small paddocks to allow of frequent changes from one to another; also the system of having several smaller flocks of sheep instead of one large one. He felt sure that if these matters were given serious thought and attention, the productive capacity of the farms would be considerably increased. Mr. Norton answered a number of questions put to him by members of the audience.

WOLLOWA.

September 23rd.—Present: eight members.

FENCING.—Mr. W. Tuendeman read a paper on this subject. He said that posts for fencing should be cut in the winter, and should be at least 4in. or 5in. thick at the smaller end; strainer posts should be 12in. to 15in. in thickness, and 7ft. in length, and the straightest and best strainers should be used for corner and gate They should be placed 3ft. in the ground, and the ordinary posts, which The posts should be should be 5ft. 4in. long, should be put 20in. into the ground. placed 4yds. to 5yds. apart. Red gum was the best timber for fencing posts, but failing that, pine or mallee would serve. Strainers should be 10 chains apart, and care should be taken that they were properly braced up. For fastening barbed wire on the top of posts he would not use staples, but thought the best method was to pass the wire through holes bored in the posts. No. 8 or No. 10 galvanized wire was the most suitable for general fencing, and three or four wires should be quite sufficient for a horse or cattle-proof fence. When erecting wire netting fences, the lower edge of the wire netting should be attached to a wire running through the posts about 4in. below the ground level.

RABBIT PEST.—A discussion was initiated on this subject, and Mr. Thompson referred to the value of charcoal fumes for the destruction of the vermin. If glowing coals were shovelled into rabbit burrows, and the mouths were closed with earth,

the results would be found to be very satisfactory.

BOOKPURNONG EAST, August 14th.—Annual Meeting.—On the occasion of the annual meeting, the Hon. Secretary (Mr. F. H. McMillan) presented the annual report, which showed that there had been 11 meetings held during the previous year, with an average attendance of 14 members at each. The election of officers for the succeeding year also took place.

COONALPYN, September 24th.—RABBIT DESTRUCTION.—In an address on this topic, Mr. F. Whitehead said the only effective means of dealing with the rabbits was to fence them out with wire netting, the cost of the fencing would be warranted by the value of crop saved. Members related their experiences with various poisons and exterminators. Carbonate of soda was recommended as an antidote for phosphorous poisoning in stock. Some discussion took place on the subject of a scheme for State aid to horse breeding.

 $\operatorname{MINDARIE},$ September 6th.—An interesting address on stackbuilding was delivered by Mr. McCabe, of Mallala.

NETHERTON, October 16th.—A discussion took place regarding the cause of "white heads" in crops. The experiences of members showed that the occurrence was more prevalent on light soils.

WYNARKA, September 24th.—Homestead Meeting.—The meeting was held at the homestead of Mr. A. Hood, and after general business had been dealt with, the members made an inspection of the crops.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

September 20th.—Present: 12 members.

Water Supply for Irrigation.—In a paper on this topic M. T. C. A. Magarey said that the experiences of the drought should impress producers with the necessity for making all possible provision for the conservation of water supplies. Surface storage frequently allowed of utilization by means of gravitation, and that was a great advantage. A number of successful bores and wells had been sunk in their locality, and he described the different formations which had been encountered in sinking operations. The availability of such supplies should enable fruit-growers to evade the effects of drought conditions. In discussing the paper, Mr. W. L. Summers referred to the success which had attended irrigation of fruit-trees in Victoria. In hilly localities the water should be guided along the least fall of the hill and the main stream should be split into three or four channels in order

to avoid washing out of the soil. Mr. G. W. Summers said that he had economically and successfully irrigated fruit-trees on his property, but it was very difficult to prevent scouring of the soil on hillsides.

CHERRY GARDENS (Average annual rainfall, 35.03in.).
October 19th.—Present: 12 members and one visitor.

CARE OF FARM HORSES .- Mr. G. Hicks contributed a paper on this subject. He said that in the management of working horses stabling was a very important consideration. A good comfortable stable, suitably closed in, with plenty of yard room, should be provided. It should be kept clean and well bedded with straw. Horses, when hard worked, should receive particular attention, and be fed with plenty of chaff, bran, and crushed oats. Nosebags should be provided for the horses when they were standing and not working. They should not be worked for horses when they were standing and not working. too long periods at a time, and should be in the stable before the evening air became If the horses were sweating when put in the stable they should have rugs put over them, and if they were brushed down at night a good deal of time could be saved in the morning. Harness should be kept in good repair, and collars should be lined with soft material and kept clean and soft. He believed in changing the collars from one horse to another occasionally, as the practice tended to prevent sore shoulders by shifting the pressure from one part of the skin to another. Putting a colt in a ploughing team was a very good method of breaking him in. He should be harnessed to walk in the furrow, as that would teach him to walk straight, and answer the pull of the reins. In his opinion the Clydesdale was the most suitable type of horse for heavy farm work. In the treatment of horses kindness to them was of the first importance. Mr. Hicks answered a number of kindness to them was of the first importance. questions put to him by members.

CLARENDON (Average annual rainfall, 33.67in.). August 23rd.—Present: 13 members and 12 visitors.

SELECTION OF FRUIT TREES .- Mr. C. G. Savage (orchardist, Coromandel Valley Orchard) attended and read a paper on this subject. He said that selection now held a prominent place in all sections of agriculture, and it would pay all fruitgrowers to give more attention to the subject. It was often said that certain varieties of fruit had "run out." Often the cause of this was the faulty way in which the fruits had been propagated in the past. Carelessness in the selection of scions had a great influence in this direction. were selected from diseased trees they tended to produce sickly trees; if wood were taken from strong growing trees which were not producing payable crops it resulted in the production of unprofitable trees. Scions taken from vigorous, healthy trees which bore consistently good crops tended to produce trees that would pay. Having selected the tree from which to gather scions, a selection of the branches which bore the best fruit should be made, provided the wood was healthy and well matured. The question of selection of varieties for different localities was being seriously considered by growers. Varieties could be suggested as suitable for certain districts, but the orchardist had to ascertain which trees were most profitable, as the constitutional fitness of trees varied with different positions and soils. The varieties would differ according to the purpose to which the grower wished to put his fruit. Often the varieties that thrived best were those the owner liked best, as he took most interest in them, and gave them better treatment. If in any particular section of fruitgrowing selection was needed more than others, perhaps it was the selection of stocks. It was a long established fact that seedling trees were longer lived than "worked" ones, and experience had proved that the life of a grafted tree varied directly in proportion to the likeness or close relation between stock and graft. For instance, a pear grafted on a pear tree was longer lived than if worked on a quince, yet the quince was useful for pear stocks where trees were planted closely together and the trees required to be dwarfed. In the Angaston district, when planting the Glou Morceau pear on the rich flats, growers frequently grafted this variety on to quince stocks, claiming that the excessive vigor of the tree was checked, and profitable fruiting brought about at an earlier date. In many cases the union was placed below the soil, and doubtless roots would arise from the pear wood which would be able to support the tree at a later stage. This should prove an advantage, as the tree should be longer lived than would otherwise be the case, with little danger of excessive

growth, for once the tree was producing good crops it was not a difficult task to keep it in good bearing under normal conditions. Generally speaking it was advisable to work the scion on to a similar tree, viz., peach on peach, or plum on plum, but variations were often necessary to overcome local conditions; for instance, where apricots were grown in damp places the stock used should be Myrobolan plum, as it would resist the effect of excessive moisture better than apricot stocks. In some of the drier districts it was advisable to work stone fruits on to almond stocks, as this stock was hardier than some of the other stone fruits. Growers who had had long experience in the dry districts said that a longer lived peach tree was the result if a late, tough, yellow flesh peach was worked directly on to an almond stock, and the required variety on to the peach. In tests being carried out at the experiment orchard in relation to the best stocks for peaches, the following had been used:-Almond, peach, Myrobolan plum, apricot, peachalmond cross, and Salvey peach on almond. The results so far showed that the plum and apricot were practically unsuitable for use as stocks for peach trees; those worked on plum stocks were growing but were very weakly, while those worked on apricot stocks had had to be reworked three times. With apples the question of stocks had received and was still receiving a great deal of attention; the working of trees on to blight-proof stocks assisted applegrowers in overcoming evils produced by the American woolly blight attacking the roots of the trees. The influence of stocks in controlling bitter pit was now being investigated; the contention was that by working the trees on to varieties which were badly affected by bitter pit the tendency was to aggravate the disease, while the use of immune varieties should tend to minimise the number of affected fruits. Usually it was better to avoid suckers for stocks, as the characteristic was likely to be reproduced. In all cases strong, healthy stocks should be selected. In strawberry growing selections could be made with advantage; the method in general practice was to select any runner irrespective of size, vigor, or productiveness of the parent plant, consequently the beds contained many unsuitable plants. The Californian practice was to go through the beds during the fruiting season and select strong growing bushes, having the different qualities which the grower desired, such as early ripening, productiveness, or larger berries. These plants were marked, and at the planting season only the plant on the runners nearest the parent bush was used and the others discarded, as this plant was always the strongest. Mr. Savage answered a number of questions put to him by members of the audience.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

September 22nd.—Present: 11 members and two visitors.

RABBIT DESTRUCTION.—In a paper on this subject Mr. H. J. Jagger emphasized a investage of taking property action to see up the orgalization of the public part.

the importance of taking prompt action to secure the eradication of the rabbit post. The recent seasonal conditions had caused a considerable decrease in the numbers of the rabbits, and a splendid opportunity offered itself for united effort on the "Some people consider they have part of landholders to exterminate the vermin. done their duty and fulfilled the demands of the Vermin Act," he said, "by simply laying a few tins of poison during one week of the year. This is only part of their duty. Whilst poison undoubtedly plays great havor among rabbits, if we followed up the poisoning by systematic trapping, and destroyed all homes and cover, we should reap a far greater advantage. If the doe is caught and killed before the breeding season it is certainly equal to poisoning 60 to 100 rabbits in February, to say nothing of the feed they have eaten and spoilt. Which of us would allow 20 of our neighbor's sheep to run in our flock for month after month But in principle, we without thinking of returning them to their own paddock. We go around the paddock and see perhaps 20 allow the equivalent to continue. or 100 rabbits go into a warren, and we say to ourselves when the grass gets dry we will lay some poison. We make the excuse that we are too busy to trap them or to use poison gas in their burrows, but I venture to say we would find time to get our neighbor's sheep out. To continue to destroy one's own rabbits and those of one's neglectful neighbor, too, becomes disheartening. Most of us object to the council sending their rabbit inspector to visit our properties, but why should we if we are doing our duty, and remember, it is to our own advantage to be rid of the rabbit? If some of us who transgress were called upon to pay a fine of £5 or £6 we should think that this money could have been more profitably spent in rabbit We, as a branch, should at once make a united effort to thin the

ranks of the bunny. I have no doubt the district council would welcome the cooperation of the Branch. As to reporting the offending neighbor, it is not a pleasant task, but, still, if a quiet reminder and warning has no effect, then the course is quite justified. Mind, not from a spirit of revenge, but out of pure self-defence. It is impossible to my mind to completely destroy all rabbits by any one method, but it is necessary to meet them at all points. Poison them when possible; use but it is necessary to meet them at all points. Poison them when dogs, guns, traps, ferrets, and keep on. This only will bring success.

> LONGWOOD (Average annual rainfall, 37in. to 38in.). September 8th.—Present: seven members and six visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. E. W. Beythien, and an interesting time was spent in making an inspection of the poultry The visitors noted the methods of laying yard, which accommodated 700 hens. The incubator room and brooder house were inspecout yards and erecting houses. ted, and the incubation and accommodation of the chickens was studied. Beythien answered a number of questions put to him, and explained the feeding ration which he adopted for laying hens.

> MEADOWS SOUTH (Average annual rainfall, 35.52in.). September 21st .- Present: seven members.

PIG BREEDING AND FEEDING.—Mr. G. Ellis read a paper on this subject. He referred to the necessity for keeping accurate accounts of the cost of production, not only of the animals under review, but also all branches of farm produce. In his experience he had had sows which had given from four to 16 pigs in a litter, but he preferred a sow which would give, say, nine pigs at each litter, as that was a good average number. A Berkshire boar mated with crossbred Essex or Berkshire sows, would give very satisfactory results. It was advisable to grow as large a proportion of the food as possible on the farm, as this would considerably lessen the cost of production. Mangolds were a very profitable crop to grow where pigs were kept. Lucerne was an excellent fodder for a pregnant sow; it was advisable to feed peas to a sow when her pigs were about four weeks old, as this encouraged the young pigs to forage for themselves. Ten young pigs which cost him £33 4s. 8d. to rear returned a total of £51 4s. 9d. Discussion by members followed.

MILANG.

October 9th.—Present: 31 members.

It was reported that on October 1st members visited the property of Mr. J. Pearce, "Kindurna," Point Sturt. Mr. Pearce yarded his sheep, and practically demonstrated many points referred to in his paper on sheepfarming recently read before the Branch. The dairy herd of Shorthorns was much admired.

HARVESTING OPERATIONS.—In a paper on this subject, Mr. J. Bagley said:— "Wheat for hay should be cut when the head shows signs of fullness, as at this time the plant is at its heaviest, having both grain and substance. If cut on the green side it always needs the addition of corn if fed to working horses. The best time to cut oats is when the top of the plant shows a yellow tinge. At this stage corn will be found in the head, as well as nutriment in the straw. If it is left until the whole of the head is of a yellow color, the straw will be of a woody nature. being cut the hay should lie for a while before being stooked. If the day If the day is hot and windy an hour or two is sufficient; if a normal day that which is cut in the morning can be stooked in the afternoon, and that cut in the afternoon can be gathered the following morning. In years when rust is prevalent it may be necessary to allow the sheafs to lie for a couple of days, or perhaps longer. stooks of four rows of sheaves inclined to the centre with about 50 sheaves to the There should be a hollow right through the stook from end to end, to allow for the free passage of air. Care should be taken to have the knot of the outside sheaves inwards. Round stooks are not to be recommended, as there is danger of their blowing over and opening out, and if made larger than a dozen sheaves rain will cause the hay to become discolored. The hay should be ready to cart in about a fortnight's time, or at any time when on pulling some hay from the centre of the stook it will crack on being bent. This is for hay going into the open. If it is going into a closed shed, it will take some time longer. In building care should be taken over the bottom of the stack to prevent waste. It is a good plan

to make use of straw and wood to keep the sheaves well away from the ground. The sheaves should be placed close together and partly on edge, with the exception of the corners, which should always cross one another. If the corner becomes too high, miss the outside sheaf; a drop downwards will then be given, and prevent the ingress of water. On no account tramp the outside of the stack; tramp the middle, A fork should be used to place the sheaves in position. but always keep it level. When coming to the eaves, keep the stack full, and the heads of the inner layer of sheaves well on to the butts of the outer layer. The sheaves used for the caves should be long, and placed flat, projecting for 3in. over the sides of the stack. The ends of the stack should be narrowed as the stack goes up. The heads of the inner layer should touch the butt end of the sheaf which forms the eave. now onwards always place the head of the sheaf outwards, and keep the middle of the stack full. Peg sheaves on the corners as the stack narrows. Particular attention is now needed to keep the sheaves slanting downwards; no tramping is needed when stacking with the heads of sheaves outwards. When the stack has narrowed to the length of sheaves, the builder must descend to one corner of the eaves, and place the butt end of the first sheaf on the eave, peg the sheaf, and work to the top of the stack, pegging each sheaf, and keeping it slanting downwards. If the sheaves should at any time dip inwards, place a loose sheaf underneath, which will always keep the head of the sheaf above that of the butt. After having gone as far as the stack is built, descend again to the eaves, place two or three sheaves on the eave, and work to the top of stack. It is now only necessary to peg the sheaf along the eaves. The stack will have a neater appearance if the butt ends of the sheaves are hammered with a piece of board to give them a slanting appearance. ance. The ridging must now be undertaken. Starting at one end of stack, place as many sheaves as are necessary lengthways to carry the stack to a point. Peg the end sheaves; now tie two long sheaves together, keeping them about 9in. apart; drop them one each side of the stack, and peg. Finish all the stack in the same way, pegging every fourth sheaf along the ridge. Always keep the binder knot of the sheaves downwards, and away from the weather, as it is only opposite the knot that rain will enter it. The stack may now be considered finished. Although perhaps not a thing of beauty, it will prevent the ingress of rain, until time is available to more thoroughly protect the hay from the weather. Of the two methods adopted for gathering grain in this district, the stripper is most preferred, as the harvester, being a more complicated machine, needs a more experienced person to operate it. An inexperienced person, by bad manipulation of the sieves and draught, will cause a serious loss of grain. There is also the loss of the chaff, which is much sought after during years of drought and scarcity. There is also the question of draught to be considered, especially on ground of a sandy, stumpy, stony, or hilly nature. There is no doubt that on firm flat country there will be occasions when the harvester will prove its superiority. The stripper can be sent into the paddock three days in advance of the harvester. When the harvester is used the grain must be thoroughly ripe and dry; if it is slightly damp or green there is the danger of weevil being bred in it. Wheat not quite ripe when reaped with the stripper, if left for a few days in the heap, matures. In stripping oats-a crop that is likely to suffer seriously from gales-it will often be found advisable, if a large area has to be gone over, to reap them when not quite ripe. After it has been lying in the heap for three or four days, turn the heap over. The oats will certainly be a darker colour than those that have thoroughly ripened in the paddock, but they will not have deteriorated either from a feeding or a seeding standpoint. If cats on the green side are cleaned up shortly after being stripped, they will shrink and go musty in the bags. The utmost despatch is required in dealing with barley, as the sooner it is in the bags and out of the way the better. Once through the winnower should be sufficient for all grain that is required for market. The machine should at all times be allowed as much draught as possible, and be fed regularly. An eight or 10 pronged fork will be found preferable to the scoop or dish, as by its use the chaff is well loosened up and passes through the winnower faster and more regularly. Bags should be turned inside out, and be left exposed to the sun for an hour or so. They do not then require so much labour in filling, and certainly are a great deal easier to sew. In cleaning for seed the machine must be worked according to the kind of rubbish that is contained in the seed. For small seeds and cracked grain always feed the machine slowly. If wishing to separate oats, barley, &c., from wheat, use one sieve low down, and feed the machine as fast as the sieve will take it. By this means all oats, barley, &c., will be carried down the spout. In operating strippers and harvesters all bearings should be loose, but bolts of same should be locked with a double nut. This will give smoother running, decrease the draught, and give greater ease in operating the machine. In some seasons there will be days when the machine will choke badly. If the comb is examined the teeth will be found to have a rough edge. This can be removed by an old file or knife.

PORT ELLIOT (Average annual rainfall, 20.33in.). September 25th.—Present: nine members.

CULTIVATION IS MANURE.—Mr. H. Green read a paper with this title. He said that producers were inclined to adopt the general use of artificial fertilisers and to neglect the thorough cultivation of their soil. Cultivation assisted, to a large degree, in making available to the plants the food which existed in the soil. If all animal manure were saved and applied to the soil, and if the growth of legumes were adopted there would be little need for the purchase of nitrogenous manures. The bad effects of excessive rainfall could be moderated by suitable cultivation, while the evaporation of moisture from the soil in the hot weather could also be minimised by cultivation. The paper was discussed by members, who, whilst agreeing that good cultivation was most desirable, were of opinion that the application of suitable artificial manures would enhance the value of the returns.

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.). October 4th.—Present: 16 members.

PIGS IN THE ORCHARD AND GARDEN.—This subject was dealt with in a paper by Mr. R. N. Cobbledick, who was of the opinion that the gardener or orchardist was well advised to keep two or more pigs. The Berkshire, he thought, was the breed most suitable, and the pigs should be provided with a wooden sty, sufficiently high above the ground to enable a rake to be used under it. Continuing, the paper read:—"A good trough is necessary. I suggest an iron one, nailed to the floor, so that the pigs cannot shift it, and knock it over. The sleeping compartment is better partitioned off, as pigs are clean in their habits. The sty should have a good roof, but need not necessarily be completely covered. It should face the east. If waste skim milk is available, pigs eight to 10 weeks old (suckers) will do all right, but in the absence of milk it is better to have stores. Pigs should not be given Pigs should not be given more food than they can eat, that is, if the trough is not cleaned out, one can be sure that the pig is being overfed. They should be fed regularly with clean food, waste vegetables, either boiled or raw, but washed. Give them greenfeed in the shape of waste lettuce, cabbage, mangolds, swedes, beetroot, in fact, anything in the vegetable line is appreciated. Feed them three times a day and they will grow on such food as I have mentioned with a little pollard added until they develop a good Pigs appreciate cool water in the summer, and also charcoal, which is very necessary for their health. If the pigs have a twist in their tail they are doing well; but if their tails hang down straight they want charcoal. For fattening give them plenty of pollard and corn, boiled or raw field peas. They will eat all produce that is unsaleable in the market, and show a good margin of profit to the owner."

At a previous meeting a paper was contributed by Mr. F. H. Stacey, who stated that whilst some years ago, the production of strawberries in the Hills was very profitable, that was not the case at present; the varieties which were then grown could not be produced at a profit. He attributed this to the deterioration of the plants, and suggested the introduction of new stock.

DAIRY Cows.—Mr. E. Hart read a paper in which he expressed the opinion that many of the cows kept in the district were too delicate and small. He recommended the Friesian Holsteins as the most suitable to the conditions. The introduction of a pure-bred bull to the district would tend to improve the stock. Members discussed the paper.

IRONBANK, September 18th.—Vegetable Growing.—In a paper on this subject, Mr. W. Slater enumerated the different vegetables which he considered the best to grow for marketing. Included in these were French beans, beetroot, cabbage, carrots, celery (the seed for which should be sown in spring and early summer, the seedlings, when about 6in. high, being transplanted and placed about 9in. or 10in. apart, in trenches 3ft. from centre to centre), potatoes, onions, and peas.

MOUNT COMPASS, September 18th.—The Hon. Secretary (Mr. S. Simons) presented the annual report of the Branch, which showed that 12 meetings had been held during the previous year, with an average attendance of 13 members at each meeting. A number of useful and interesting papers and addresses had been contributed at the meetings, and very profitable results had attended the year's operations.

MOUNT PLEASANT, October 8th.—Mr. H. A. Giles read an extract dealing with the shortage of sheep existing in South Australia, and the lack of provision of folder for sheep. The matter was discussed by members, who thought that landholders should be urged to realise the importance of conserving folder.

STRATHALBYN, October 19th.—Mr. B. Heinjus contributed a paper on hay-growing, and general discussion followed. It was agreed that wheat for hay should be cut in the dough stage and left from 14 to 21 days before carting. The local practice was to make long narrow stooks in preference to round ones.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.). September 20th.—Present: Five members.

SHEEP-BREEDING.—In a paper on this subject Mr. J. Riddoch said that as a result of the drought a great shortage of stock had been created, and it behoved farmers to endeavor to remedy this shortage as quickly as possible. Sheep required little attention and gave good returns of wool and meat. The production of fat lambs was particularly remunerative in view of the present state of the market. Merino-Lincoln ewes were the best for lamb production, and they produced a good fleece. These ewes should be mated with a Lincoln ram, and excellent lambs would result. If they were mated early in January, the lambs should be in prime condition for the Christmas market. However, if feed were plentiful, it would pay to shear the lambs and market them in March, when there should be a better demand for them. In discussing the paper, Mr. J. T. Halliday recommended the Border Leicester ram. Mr. F. A. Telfer favored the Shropshire ram. He thought lambing should take place in July, as the lambs were not then likely to suffer a check as the result of cold weather. Mr. J. Riddoch, in replying, said he considered that a ewe and a lamb should return a profit of 25s. from the sale of wool from both and the sale of the lamb. He used one ram for every 50 ewes. He mentioned that during the recent season he had an equal number of Lincoln and Shropshire rams running with ewes, but only about one-third of the lambs were Shropshire-cross.

> KALANGADOO (Average annual rainfall, 33in. to 34in.). September 11th.—Present: 11 members.

Drainage of Land.—In a paper on this subject, Mr. Geo. Bennett described the different classes of country to be served by the drainage works now being carried out in the South-East. It appeared to him that although the work being done in other parts might be successful, the land around Kalangadoo did not readily lend itself to drainage, owing to the fact that the subsoil was of a clay nature. To secure any measure of success, the land would have to be suitably subdivided and fenced in accordance with a comprehensive drainage scheme. Drains would probably be required around all paddocks, and each paddock itself would require cross drains, and these, in turn, would probably require to be served by tile drains or covered in drains with wood or stone underneath. This would mean very heavy expense, which was not warranted under present conditions. The paper was freely discussed by members.

KYBYBOLITE (Average annual rainfall, 22in.). August 19th.—Present: 14 members.

PLOUGHING.—The following paper was read by Mr. L. S. Davie (Manager of Kybybolite Experimental Farm):—"Our ploughing varies in method, according to the type of soil, the climatic conditions, the kind of crop that is to be sown, and

the time which is to elapse before the seed is sown. The object is to secure the best possible conditions for the germination of the seed sown, and for the subsequent growth of the plant. The former objective means that in ploughing the present or future production of a firm seed bed with a fine tilth on the surface must be kept in mind, and the latter the provision of the utmost amount of plant food. which can be made available through the chemcial and physical changes brought about in the soil, and an increased facility for the extension of the root system to The increased chemical action which takes place after ploughing utilise this fund. is the effect of bringing a greater amount of soil in direct confact with the air, and exposing it to the sun. The surface soil has been exposed to these influences for some time, and therefore is the layer richest in available plant food, this is turned under and fresh soil brought under the weathering influences, thus the plant to be sown has a greater quantity of available food in proportion with the quantity of Summarising the matter as far as we have gone, it would fresh soil broken up. seem that the deeper we plough the better, but we now have to consider the physical condition of the soil, and we find that to a greater or lesser degree, in all soils, the more so the stiffer they are, the deeper we go below the surface the more unsuitable the soil is for the growth of plants, i.e., before it has been improved by cultivation, especially for the germination of seed, and for young plants, therefore the physical condition of our soils in relation to plant growth, governs the depth that it is pro-In turning up the unsweetened soil, only such quantity fitable for us to plough. should be brought to the surface as can be brought into suitable condition for the best growth, before the crop is sown. As there are exceptions to every rule, we will probably find by experience that there are occasions when a little more than this quantity may, with advantage, be brought to the surface. I intend referring to this point later in connection with the treatment of new ground. So far we have considered ploughing in regard to the type of soil, we will now study variations in method which are the outcome of differences in climatic conditions. greater part of South Australia at present farmers have to practise bare fallowing, and as in this case the seed bed is not produced by the ploughing, this operation is regulated only by those matters we have already discussed, and the climatic condi-This last factor determines the time in which the operation is likely to be most beneficial. As a general rule, the drier the district the earlier the ploughing is done the better, but in the southern parts of the State, where conservation of moisture is not usually a consideration, it is a disadvantage to plough while the land is in a waterlogged condition. Aeration cannot then take place properly, and plant food which may be made available is exposed to leeching; also the land is not broken up to the same extent, as when only the necessary amount of moisture is present to best suit the ploughing operation. Where the land is likely to become waterlogged at any time through the winter, and good spring rains are the general rule, it is likely to prove advantageous to resort to early spring fallowing. permanent experiments on the experimental farm here, established for the purpose of testing this matter, although not of long enough duration to be definite, have given results which will admit of only one conclusion. The results of these experiments to date are:

1913—Highest yield—Spring fallow, 53bush. 51bs. per acre.
Next best—Winter fallow, 46bush. 29lbs. per acre.
1914—Highest yield—Spring fallow, 17bush. 0lbs. per acre.
Next best—Winter fallow, 13bush. 18lbs. per acre.

"One other advantage in ploughing in the spring, where there is an over abundance of moisture, is that the surplus is more easily got rid of, as evaporation is more rapid when the weather becomes warmer and where drainage is necessary a greater quantity flows away, and at quicker rate, before the land is ploughed. Under these conditions practically the only time at which the land is in a proper condition for ploughing is in the spring, and as cultivations for any purpose but the production of a good seed bed are not an advantage in themselves, useless work of this nature, which will be necessary to cope with the weeds in the case of earlier ploughing is avoided, and the cost of production is correspondingly reduced. Climate, therefore, chiefly affects the time of ploughing, which depends on whether the conservation of moisture is aimed at, and the length of time one is able to plough. The operation should always be performed before the time of year when the soil is likely to become too dry. The type of soil, which we have already considered in other respects, also has a controlling influence on the time that it is best to plough for fallow, the lighter the soil the earlier it should be ploughed, taking

into account climatic conditions, in order to give ample time for the proper consolidation of the seed bed. At whatever time of the year, however, that it is found best to conduct fallowing operations, the method of ploughing does not differ materially in other respects. The variety of crop to be sown affects the ploughing only in cases where the seed is sown immediately. It is essential to good germination that the ploughing should be such that a firm seed bed is produced, but some plants require a firmer bed than others, still, excepting perhaps in the case of new ground, and when other conditions such as weed growth, will not allow of it, a comparatively shallow ploughing should be aimed at. In reference to the contention that an exception to the rule of shallow ploughing, when done just before seeding, might be made with advantage in the working of new ground, I consider that the matter should not be looked at from the standpoint of the first year results alone, but that a little deeper ploughing than would be best under the same conditions with previously worked land, would give a better ultimate result in two or three years, more especially when dealing with medium to heavy types of soil. of the sweetened layer in these virgin soils is comparatively small compared with those that have been previously worked, and if one only stirs this, the seed sown may germinate very well, but the plants will have difficulty in extending their root. Thus there is little chance of their doing as well as if the best soil had been turned under, and the plant foods contained used in conjunction with a much larger area of poorly aerated sour soil, which, however, is improved by the working, to the extent that fresh plant foods are continually made available during the growth of the plant, and the root system is able to extend and procure this food. With regard to succeeding crops, if the new ground is ploughed to a depth of from 4in. to 5in. in the first year, according to the nature of the soil, it will certainly mean better conditions for these crops than if ploughed to a depth of 2in. to 3in., as the benefits of fallowing will, to a large extent, be realised. The only apparent drawback, therefore, to ploughing new ground to a fair depth just before sowing, would be when preparing for plants which need a very firm seed bed, and this diffi-culty could, to a great extent, be overcome by sowing a greater quantity of seed per There is one other item in ploughing to which more care might be given with advantage, and that is the turning of a proper furrow. The width should never be greater than twice the depth, that being the absolute maximum for the proper covering of weeds, and leaving of the soil in such a position as to give the very best results from the action of those natural agents which improve it. outline of the principles which underly our different methods of ploughing, we have found that it is an advantage to plough deeply as long as we do not stir up soil containing constituents injurious to plant life, but, in conclusion, I would emphasize the fact that the deepening process must be a gradual one. One cannot reasonably condemn deep ploughing after giving it a trial by ploughing 6in. deep, where one had previously ploughed 3in. The sweetening of the soil under the influence of exposure to air and sun, is a slow process, and even if when gradually increasing the depth pronounced beneficial results are not at once noticed, one can be certain that if the operations are spread over a number of years, the benefits will be considerable."

> MILLICENT (Annual average rainfall, 29.25in.) September 14th.—Present: nine members.

Fodder Crops.—Members discussed a lecture delivered at a recent Bureau conference by Professor Perkins, on "Fodder Crops in the South-East." Mr. Hart advised members never to put male stock into the remnant of a root crop. When the tops were fed off, the sap produced in the roots by the action of the sun was injurious to male animals. It did not affect ewes and lambs. [Mr. Place states that old roots left in the ground cause pizzle disease, occlusion of uretha, by phosphatic salts.—Ed.] It was better to plough up the butts shortly after the tops were gone. When putting in the seed, the manure should be sieved, and sown through the oat feeds. He had grown mangolds for 40 years, and had never known a frost hard enough to injure them. When the bottom leaves began to turn brown and hang down, the roots could be pulled, and they would keep until January. They were best fed in this way to fatten pigs, which did not thrive on green mangolds. The roots should be allowed to shrink to about half the size when pulled, and with a little corn pigs would then do remarkably well on them. His experience with turnips was that they should be sown during September, October,

and November, and they matured in 13 or 14 weeks, ready to feed off in January, February, and March, leaving the land in tip-top order for grass, rape, or other fodder. Mr. Mitchell had tried sowing them in every season, without success. It was suggested that probably the seed was at fault. Mr. Hart said if sown in April the turnips must be put in very early in the month. A long and interesting discussion ensued on various fodders, and the methods of cultivating them. Mr. Downs recommended a pinch of saltpetre in milk or cream as a means of removing the objectionable aroma from butter produced from cows fed on kale.

MOUNT GAMBIER (Average annual rainfall, 32in.). October 9th.—Present: 21 members.

PURCHASE OF MACHINERY.—Mr. H. M. Hogan delivered an address on this subject, and referred to the relationship existing between buyer and seller, and mentioned ways in which the buyer could assist the machinery merchant, and thus reduce the cost of the machinery.

ENSILAGE.—Mr. J. Davidson recommended members to conserve fodder by manufacturing ensilage. Mr. Fahey had pitted about 20 tons of Cape barley, rape, and mustard. Mr. K. McIntosh said the presence of limestone rock made it easy to make a good silo pit. The cost of a limestone pit, to hold about 100 tons, would be about £40 to £50.

NARACOORTE (Average annual rainfall, 22.60in.). September 11th.—Present: 20 members and two visitors.

TREATMENT OF BRACKEN FERN COUNTRY.—Mr. A. O. Forster contributed a paper on this subject. He said that fern country in their district varied a great deal. Where chocolate soils overlying clay existed, almost any crop could be grown with a little and constant cultivation. The timber that grew on these soils consisted a little and constant cultivation. The timber that grew on these soils consisted mostly of what was known as hill gum, and this could easily be got rid of by cutting it close to the ground. He would not recommend the stringybark fern land for growing anything but wattles, as they grew very easily so long as they were, while young, protected from stock. For clearing land of fern he would first recommend sheep. Continued cutting of the ferns for a few years would also be found very effectual. Fern land should be ploughed with a disk implement in January or February, when the fern root was commencing to sprout. could be utilised with advantage for the growing of early green feed, such as rye, peas, or rape. Wattles thrived, and would be found profitable. Mr. Rogers said there was a great deal of bracken country in the district, which was difficult to rid of ferns, and referred to the value of pigs in that connection. Mr. Tidy had tried pigs with success, and the land afterwards grew good feed. Mr. Haynes recommended growing peas. He also had found that pigs were very useful in the clearing of fern land. Mr. F. A. Holmes considered that regular cutting was one of the best means of destroying ferns. The Hon. Secretary (Mr. W. H. Smith) also supported the practice of cutting the ferns; burning had not proved to be at all successful. There was a great deal of fern country capable of growing crops and fruit trees, and it was therefore desirable to ascertain the cheapest and most effective means of ridding the land of the fern. Mr. Wardle said that he had not found the cutting of ferns to be successful in eradicating them. ploughing was the best method. He had ploughed land two or three times a year, and sown it with rye or peas; after feeding off the crop the land required to be ploughed again. He had grown oats on this country, and reaped up to 20bush. per acre from it. The Chairman (Mr. S. H. Schinckel) had used the disk plough with good results. Sheep were not only very effective in destroying ferns, but they considerably increased the fertility of the land. The best crops to grow were rye, white mustard, Chinese cabbage, oats, and peas; the last-named crop was particularly valuable for feeding off with sheep. Mr. Donohue also spoke.

THE FOX PEST.—Mr. A. J. Johnson made inquiry as to the best method of des-

troying foxes, and the chairman recommended the use of poison.

Mr. W. Gould exhibited some turnips of the white stone variety, which were much admired.

TATIARA, October 2nd.—The Chairman (Mr. T. L. Truman) read a paper from the Journal on cutting of hay crops. Members were of opinion that in the Tatiara district hay was cut when too ripe, with the result that it did not command the highest market price.

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All communications to be addressed:

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Wheat Engorgement.

Drench with 4lb. baking soda in quart of warm milk.

Back rake, give large enemas of warm soapy water.

Encourage horse to drink as much and as often as it will.

Give no food till wheat is passing freely.

Give plenty of brisk exercise.

Bleed at neck vein.

Soak foundered feet continually with either hot or cold waterswab.

Groom body and legs well three times a day.

Rub distended flanks briskly and eften.

Prevention is cheaper and more effective than treatment.

FRAS. EVELYN PLACE.

Patriotic Funds.

The October issue of the *Journal* contained a list of Branches of the Agricultural Bureau which had donated the produce of a proportion of the crops grown by members to the Belgian Relief Fund. To this list should be added the Coorabie and Gawler River Branches. The Strathalbyn Branch has also spent two evenings in the manufacture of sandbags for the soldiers.

South Australian Honey in England.

The Trade Commissioner in England, in his report of September 9th, says:—"I have ascertained from Major Woods, the officer who superintends the whole of the passing of foodstuffs for the Army, that the South Australian honey was the only contract which satisfactorily passed the analytical authorities. I believe that two other contractors had their honey returned to them, owing to the honey not being pure. At the present moment there would not be any difficulty in obtaining large orders for South Australian honey, if you were in a position to let me have supplies."

Dogs Troubled with Fleas and Worms.

In reply to an inquiry as to a means of treating fleas and worms troubling a dog, the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) recommended a correspondent to destroy all bedding, and sulphur places where the dog lay, and wash it once a week, during hot weather, with "Lux" and a little coal tar disinfectant in the water, and dust daily with insect powder. As fleas kept on

hatching out, this had to be kept up for a few weeks, till all were exterminated. They took refuge on the head and ears of the animal, so these should be soaked at the outset of the bath. For the treatment of worms, the dog should be kept away from rabbit offal, and starved for 24 hours. One should then grate up a fresh areca nut and give 2gr. per lb. liveweight—about half a nut for a sheep dog. This should be mixed with butter and put down the throat, and followed with a table-spoon of castor oil. The beast should be tied up so that he could not get his head down for a few hours, or he would try to vomit, and the medicine would not have time to operate. All excreta should be burnt, and treatment repeated once a month for a few times. The growing head of the tapeworm was a tiny dot at the thin end, and must be got rid of before a cure could be effected. A good bush remedy was a quid of tobacco put down the throat.

Fruit Tree and Grape Vine Pruning.

The fifth edition of the Handbook for Fruit and Vine Growers, prepared by direction of the Honorable the Minister of Agriculture by the Horticultural Instructor (Mr. Geo. Quinn), has just been published. This edition has been issued owing to the exhaustion of the supply of the previous issues, and it contains a few additions to the previous editions, referring principally to the treatment of peach and apricot trees, grown under the influence of irrigation and strong sunlight.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being * contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"H. G.," Salisbury, has a foal with swelling near navel; soft and can be pushed back into belly through a small round hole.

Reply—This is a navel rupture, umbilical hernia, and is the want of union between the fibres of the belly wall, which were parted to allow the navel string passage. A light blister might be applied, which would cause a large, soft swelling, and ultimate closing of the rupture.

"E. J. K.," Willowie, reports that cows go suddenly stiff, and off feed for some hours, are unable to rise, but recover naturally.

Reply—The symptoms are those of an acute digestive poisoning by glucosides, which are formed from many plants during digestion, notably sorghum, millet, dandelion. A satisfactory treatment in such cases would be to drench with a pound of treacle in a quart of milk, or to give a pint of yeast. The plant sent, Spergularia rubra, sand spurry, a common weed in this State, belongs to a family, many members of which form glucosides, called saponins, and in some cases with fatal results. While no definite blame can be laid at its door, it may have something to do with the trouble.

"R. P. S.," Cleve, has a three-year-old horse which three months ago developed lump on wither, which broke on off side, and has been discharging ever since, in spite of treatment with hot water and tar.

Reply—The trouble is fistulous wither. The treatment is to probe each pipe (fistula) from which matter comes, to open out each to the bottom; then scrape away the diseased tissue, bone, or gristle, clean up with spirit of iodine, and daily for an hour irrigate with cold water

from a tank pipe or a kerosine can with a cord through it. If the operation is thoroughly done it will heal in some weeks, otherwise never.

"G. P.," Milang, reports that sheep go blind suddenly, with a white scum over the eyes. He asks whether powdered sugar or alum would remove the scum.

Reply—The scum is in, not on, the eye, so that sugar or powdered alum would not remove it, although, as it often disappears after their use, one is inclined to believe that has happened. It is caused by breaking down the blood by parasites in the cells, and requires constitutional rather than local treatment. If handling the sheep a little boracic acid may be dusted into the eyes, and much benefit would follow the use of Cooper's worm tablets, which are a handy way of giving the medicine necessary, namely, arsenic.

"A W. L.," Eden Valley.—See above reply to "G. P."

"A.N.," Goolwa, has a mare, six years, which fell, damaging knee and hip; both recovered, but later the mare became lame in near fore, with swellings at sides and back of fetlock.

Reply—It is difficult to say where the lameness is without an examination; the swellings so well described are windgalls, *i.e.*, distended oil sacs. It is quite possible a tendon that divides at the back of the fetlock is the seat of lameness, but it is more probably a bony growth between the small bones of the knee. She is not likely to be fit for use in three weeks under any treatment. It would be well to blister the knee and fetlock by well rubbing in a blister of 1 dram biniodide of mercury and 7 drams lard, and then giving her six or eight weeks' further spell.

"A. C. F.," Petina, has a horse with a growth in the eye.

Reply—From the description the growth is not a cataract, but a form of cancer on the third eyelid. It should be cut out. The method is to insert a grain tablet of cocaine in the eyelids and let it dissolve; then, five minutes later, seize the growth with forceps or safety pin, and with sharp scissors cut off the growth and part of the third eyelid upon which it grows. Dust with boracic acid occasionally afterwards.

"W. T. W.," Gawler, had a mare die after coming up breathing hard and trembling; mouth and tongue blue, after death pink.

Reply—The bladder usually empties at death; the symptoms are those of circulatory congestion, over strain of the heart, due possibly to distension of the stomach in this case. It would have been well to have bled her at the jugular when first noticed.

"R. E. H.," Millicent, had a pony which tripped on loose stone and fell; suddenly acutely lame near-side hind fetlock; recovered in a

week, but after putting weight suddenly on leg on sandhill went lame again. There was swelling behind fetlock.

Reply—The trouble seems to be with the division of the suspensory ligament, which is the weakest part of that organ. It would be well to blister round the fetlock with 1 dram of biniodide of mercury to 7 drams of lard well rubbed in, and then give the pony a long spell of, say, three months.

"W. W. G.," Bowhill, asks the reason that a young mare, in good condition, slobbers.

Reply—If under four, because grinder teeth are being cut; if over, possibly grass seeds under tongue or in gums, or, if beginning to lose flesh, worms in stomach. Examine mouth, and if from either of first causes, remove agent and dress with solution of Condy's crystals or alum. If stomach worms are suspected, a teaspoonful of baking soda in feed twice daily for three weeks.

"E. K. D.," Edillilie, had a horse bleed to death from cut fetlock.

Reply—In such an accident, put a pad with starch or alum over the wound and bandage tightly; put a bit of stick on each side of the back tendons and tie tightly with cord, twisting it very tight with a bit of stick like a pencil. This will stop the bleeding, and may be removed in a few hours.

"H.C.P.," Honiton, reports the appearance of a raised sore, with scab, under which it is mattery and sore, on the ears of sheep.

Reply—The trouble is not cancer, but due to a parasite, and if dressed with Cooper's sheep dip will get all right. The flesh is quite fit for food. The disease is not likely to be communicated to anyone handling the sheep if ordinary cleanliness is observed. Flies might carry it, but are not likely to if the ear is dressed. Look up the Brands Act before cutting off the ear, or there may be trouble.

"W. F.," Coombe Siding, has a cow with a cheesy growth on white of eye.

Reply—The growth is caused by the irritation of larval worms in the circulation or similar irritant. Put one grain of cocaine in the eye, and wait five minutes till it has been absorbed; then paint the growth with a caustic pencil (silver nitrate). Repeat the treatment fortnightly if necessary to keep the growth in check. The milk is not affected in any way by the growth or treatment, and may be used.

"R. W.," MacGillivray, Kangaroo Island, reports that pigs at a month old lost power of hind limbs, otherwise seemed well; another had trouble with breathing organs as well.

Reply—It would appear that the sow was a bit over-fat during gestation, and the symptoms resulted from this. Try cinders in feed, with

a tablespoon of sulphur to each pig once a day for a week or so, and 10 drops tr. nux vomica twice a day to those that cannot use hind-quarters. Five grains of calomel given in a little diluted molasses to each pig at start of treatment would probably do good.

"C. W.," Netherton, reports pigs troubled with eversion of the anus. Reply—A common cause of this trouble is lying wet and cold, and also too much sameness in feeding. Local treatment—Dress with tr. hamamelis 1, lard 10 parts daily, if necessary. Give cinders in feed and sulphur at the rate of a teaspoon for young pigs, a dessert-spoon for a sow, once daily for a week or so. It is always well to hesitate before destroying pigs thus affected, for as a rule they yield to treatment.

"F. F. W.," Bagot's Well, states that a cow had dead calf, and one teat has gone quite hard.

Reply—Inflammation of the udder resulted from absorption or septic material through the circulation. Foment the quarter well with hot soapsuds twice daily, and on one occasion only inject up the teat a mixture of one tablespoon of glycerine and one of spirit of wine.

"W. P.," Bews, reports a stallion slack at service.

Reply—The symptoms point to congestion of the liver as the cause of the disinclination to serve. Put him on bran only for three days, and each day give him 4ozs. of Epsom salts in it. When he comes on to his ordinary feed again, give him a tablespoon daily of this mixture in feed—One-quarter pound each of sulphur, sulphate of iron, saltpetre, and black antimony, with one pound of linseed meal. After his season a good dose of physic would do him good.

"H. H.," Kulde, reports that a heifer licks metal, lime, and dung.

Reply—This depraved appetite is a preliminary symptom of the diet deficiency disease often called dry bible. The heifer will probably do well if the following treatment is adopted—Give 12ozs. Epsom salts and 1oz. ground ginger in a quart of warm coffee, grounds and all. When the effect of this has worked off, give her twice daily on her tongue two tablespoons of syrup of phosphate of iron for a week. And as a regular thing let her have access to a lick composed of three parts bonemeal and one part saltpetre.

"J. S.," Cleve, seeks information re (a) scirrhus cord in yearling colt, and (b) colt with swelling on belly.

Reply—(a) Is not likely to get well without treatment, but surgical would be the best; failing this, 1 dram of iodide of potassium in bran twice daily for a month, and daily dressing of the sores with tincture of iodine. (b) The swelling seems to be a slight varicosity rather than a rupture, from its situation. Apply a slight blister or Stockholm tar, and it will probably disappear.

- "J. F. N." has a cow affected with redwater six weeks after calving. Reply—Give 31b. Epsom salts and 20z. ginger in warm gruel; then twice a day for a few days 20z. tinet. perchloride of iron in a pint of red wine.
- "O.G.," Nantawarra, has a horse with injured hock, badly swollen, and discharging oily matter.

Reply—A synovial sac is involved, hence the oil; treatment will have to be continuous and long. The hock should be dressed twice daily with spirit of iodine and then dusted with chlorinated lime (one) to fuller's earth (seven). When, after some weeks, it seems to be getting on, Stockholm tar may be applied instead.

"R. R. S.," Bool Lagoon, had a horse with a stone embedded in the sole.

Reply—The animal is likely to be lame for some weeks, but may be worked if the following treatment is adopted:—Have the foot shod with a broad webbed shoe, one which covers part of the sole as well as the wall. Dress the bruised hole daily with arnicated oil, tr. arnica one part, olive oil 20 parts. Soak tow in spirit of iodine and make pad over sole; have a piece of leather the shape of the sole, and just large enough to tuck under shoe; fix this in place by two slips of hoopiron crosswise sprung under the shoe. Remove when not at work.

"L. S. P.," Geranium, has an aged buggy mare stiff in legs and neck. The animal was served by a draught stallion for the first time.

Reply—The symptoms are those of rheumatism, possibly connected with the service. Groom well all over for half an hour a day and give a tablespoon of the following mixture once a day for a fortnight in the feed, which should be slung up in a bag:—Quarter pound each sulphur, bicarbonate of soda, carbonate of ammonia, gentian, and 1lb. linseed meal.

"H. C. D.," Strathalbyn, reports a cow with induration of os uteri.

Reply—As the constriction is so marked, it is doubtful if conception can take place. Artificial insemination might be tried, but there would be trouble at calving time; or the neck of the womb may be opened surgically by passing a guarded knife in and severing both sides of the fibrous constriction, taking the greatest care to avoid wounding the iliac arteries, which would bleed her to death; their position may be felt by their pulsation. The os uteri should be plugged with aseptic tow after the operation, to prevent further constriction during healing.

"M. McM.," Verran, has a horse affected with slight founder.

Reply—Give for a week 10 drops of tr. aconite morning and evening on tongue, then next week 10 drops tr. arsenicum similarly, and alternate for six weeks. Blister the hoof heads of the front feet, and after-

wards keep in wet clay when not working. Treatment will bring about improvement, but is not likely to be entirely satisfactory.

"Shorthorn," Crystal Brook, has a cow which gives stringy milk from hind teats.

Reply—The symptoms point to chronic inflammation of the hind-quarters of the udder, which may be tubercular, though probably not. Drench the cow with \$\frac{3}{4}\$lb. Epsom salts, 1oz. sulphur, \$\frac{1}{2}\$oz. ginger in a quart of warm beer. Foment the udder well with hot soapsuds twice a day after milking, and inject up the teats once daily for three days, repeating after 10 days if necessary, half a teacupful of a solution of a teaspoonful of boracic acid in a pint of warm water. The milk, even of the front teats, should be boiled before use, and that of the affected ones should not be used at all.

"F. L. V.," Brentwood, has a mare with swelling of hind legs.

Reply—The cause is probably a mange mite, and relief will follow the daily application of benzine one part, olive oil five parts, while a tablespoonful of sulphur may be given once daily in the food for a fortnight.

"C. N.," Mount Barker, asks for a means of determining the sex of wild rabbits at the age of from four months to six months.

Reply—The penial orifice is circular, the vaginal vertically linear. The buck is heavier in front, and his scut more masculine than the doe's.

"W. P.," Kingston-on-Murray, has a horse which cut offside fore fetlock; slow in healing, with hard lump, which appeared after severe plunge, and following lameness.

Reply—The history suggests that owing to the severance of the tendons the joint was unduly strained by the plunge, and inflammation of the bone set in. Probably little can be done beyond keeping the injury well dressed with Stockholm tar, and allowing the horse six months' spell.

"T. F. O.," Wepowie, reports black accumulation on teeth of ewes.

Reply—The black substance is "tartar," more in this case than is usually found; it is an indication of indigestion, which would account for the ewe falling away. A certain amount will be found on the teeth of all adult sheep. It can be removed by scraping and rubbing with baking soda.

"W. F.," Ramco," states that a mare off bush feed, melons, &c., has great difficulty in walking, especially on metal.

Reply—The symptoms point to laminitis or founder, following acute indigestion, as it often will; stand the mare in mud over her fetlocks for several hours daily; also give her a flat tablespoon of the follow-

ing powder once or twice a day for a fortnight:—41b. each of sulphur, saltpetre, nux vomica, and gentian, and 11b. linseed meal. The prospects of a complete cure are very remote, although there may be a temporary easement.

"F. A. P.," Carrow, has a cow, apparently in good health, but unable to rise; grating noise in stifle.

Reply—There is injury to the stifle and probably a fracture, so that she will remain down for a time, and must be made comfortable. If this is the case, the milk will be fit for use. Rub some of the following liniment into the joint every day:—Turpentine, 1½ozs.; sulphuric acid, 2 drams (mix very carefully); linseed oil, ½ pint.

"H. G. W.," Mount Gambier, has a bull with enlargement of penis, soreness, disinclination to serve, swishing of the tail.

Reply—The symptoms of burn, or gonorrhea, probably contracted from a cow. It is right to take him off service, as he is not likely to get stock while affected, and may infect cows. Obtain a large size glass syringe (not metal); dissolve a tabloid (Burroughs & Wellcome) of perchloride of mercury in a pint of warm water, and after thoroughly cleansing the parts with soap and water, inject the solution up the sheath around the parts once a day for three days; then every other day for a week, and he will probably be cured. It is as well to give a little cooling medicine internally, such as a tablespoonful of sulphur once a day for a week.

"G. A. R.," Dutton, asks for treatment for greasy heel.

Reply—If you are a reader of the *Journal of Agriculture* you will find replies on this subject in recent numbers. Try sugar of lead and sulphate of zinc of each ½oz., methylated spirit and water of each half pint, applied twice daily.

"F.S.H.," Alawoona, has a horse with cough and nasal discharge.

Reply—Work is dangerous; he must be spelled till better. Steam head with mallee leaves once or twice a day and give a teaspoon of saltpetre twice a day in feed for a few days.

"A.B.C.," Coomandook, has a horse with cracking in hock, or above.

Reply—The sound is probably produced by laxness of the ligaments and tendons of the stifle joint, and will probably disappear if that joint is rubbed with eucalyptus oil when the sound is noticed.

"G. H. M.," Mannum, reports that colt died with swellings and discharge, nine weeks after castration. Also asks whether red rags on horses' throats have any virtue in keeping off bots.

Reply—(a) The trouble was bastard strangles, which was incubating at the time of castration, which operation should never be carried out when sickness is about or without an examination of the colt to see that he is healthy. A dessertspoon of sulphur in feed daily is a good preventive when several colts seem to be affected; it may be given for a week. (b) The red rags are useful, if long enough, and little bells on the throat strap also scare away the fly.

"A. P. A.," Stansbury, has a foal which was bitten by a horse on back of neck; bruised and poisoned, with much swelling.

Reply—The treatment of fomentations, Condy and boracic acid, has been all right, but it is to be feared that there is damage either to the ligament of the neck or the spines of the back bones, in which case healing is not likely to occur until the damaged tissue has been removed surgically. In the meantime dress the wound daily with spirit of iodine, taking care to get to the bottom, either with a syringe or feather, and if this is difficult, do not hesitate to open up with the knife to make it easier. A good external dressing to keep off the flies will be one part of sulphur to seven parts of boracic acid, and a spray of one part cucalyptus with seven parts benzine.

"M. B.," Lucindale, had a draught gelding which swelled under throat and along jaws; stiff and hollow, would not lie down, sweated under mane and throat; died on fourth day.

Reply—The symptoms are those of severe upset of the circulatory system, and it is possible in this case that there was snakebite. In a similar case it would be well to treat the swelling by hot fomentations and liniment, and to give, mixed with molasses, on the teeth three times a day a teaspoonful of baking ammonia (carbonate of ammonia).

"H. C. E. R.," Wildhorse Plains, asks treatment for a ruptured colt.

Reply—It is generally advisable to castrate a colt ruptured in the purse as early as possible, as the closure is better ensured. Prepared gut or kangaroo tendon is the best material to use, as it is gradually absorbed. Do not cut the inner skin until sewn, and also after sew the purse.

"F. N.," Meadows, reports horses breaking out in pimples on legs and cracking of heels.

Reply—The conditions are probably due to the activities of mange mites (*Acaris chorioptes*), and improvement will follow if the horses get a tablespoonful of sulphur in the feed once a day for a week, and have their legs dressed every evening with benzine one part, any cheap oil five parts.

"J. H. K.," Petersburg, has a cow bleeding severely at nose.

Reply—Probably result of injury. Syringe the nostril with arnica lotion of one part tr. arnica to 20 of water, and give 10 drops of tinet. arnica on tongue two or three times a day for a few days. The nostril may be stuffed in tow soaked in the lotion.

"W. S.," Forster, has colts, two years, with lumps above knees, bowlegged and stiff.

Reply—The symptoms are those of ricketts or scurvy, pointing to deficiency of certain food elements. Give each colt once a day for a month a tablespoon of syrup of phosphate of iron (they will eat it up in chaff and bran), also a small handful of bonemeal for the same period. Rub the lumps every day with eucalyptus oil.

Inquiries, which have been answered direct, were received from the following:—Forster Agricultural Bureau; "R.W.," Kangaroo Island; "C. H. C.," Wirrabara; "H. G.," Pinnaroo; "C. O. R.," Julia; "J. F. W. P.," Tanunda; "M. V. D.," Terowie; "J. B.," Willaston; "A. G. C.," Mypolonga; "J. F. W. P," Tanunda; "A. J. D.," Keith; "J. B. A.," Meningie; "A. N. R.," Wirrabara; "T. H.," Willowie; "G. E. O.," Yaninee; "C. O. R.," Julia; "B. W.," Hartley.

DIAMOND-BACKED CABBAGE MOTH,

"C.L.B." forwarded some specimens, and mentioned that his cabbages, cauliflowers, turnips, and rape had been destroyed by the The Horticultural Instructor (Mr. Geo. Quinn), to whom these were referred, reports:--"The cruciferous plant forwarded was attacked by the diamond-backed cabbage moth (Plutella cruciferarium zell), both larvae and pupae being present upon it. which attacks all cruciferae, including stocks and wallflowers, thrives during spells of mild, dry weather, such as punctuate the socalled winter in drier areas. Such plants as cabbage and cauliflower may be dealt with in the seed bed by spraying them with arsenate of lead, loz. to the gallon of water, as the seed bed is often a nucleus from which the pest obtains a good footing in the garden, and may thus spread to the rape in the fields. Old stocks and wallflowers kept over summer often form a connecting link or carry over for Young cabbage, cauliflower, turnips, and even rape, may be sprayed with arsenate when in the early leaf, but, of course, must not have the foliage meant for food for man or beast coated with this poison. The secret of suppressing this, like many other insects, lies in early, prompt action. When the attack has developed the crop is doomed."

POULTRY INQUIRY.

"A.J.," Yadnarie, asks whether a White Leghorn rooster with yellowish feathers should be used for breeding purposes? The Poultry Expert replies:—"The yellowish feathers may be due to stains (iron in soil), or to excess of sap (pigment), or to the effect of hot sunshine. In any case, if the White Leghorn is of a good laying strain it does not interfere with breeding good layers. Such a defect might count in the show pen—but show fowls, as a rule, do not pay farmers."

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on December 1st:-

BUTTER.—The weather during November was pleasantly cool and favorable to the marketing of dairy produce. Seasonable shrinkage in production, however, has occurred, so that after a lapse of some months South Australia is again looking to the Eastern States to make up the shortage in top qualities. Prices for factory butters rapidly advanced towards the end of the month, and now "Alfa" is selling at 1s. 5½d.; "Primus," 1s. 5d.; separators and dairies, 1s. 2d. to 1s. 3½d.; store and collectors, 1s. 0½d. to 1s. 1½d. per 1b.

Eggs.—Supplies maintained well, but the heavy demand both for local and export caused market to advance during the month, though towards the end values receded somewhat, with closing price: hen, 1s. 2d. per dozen; duck, 1s. 3d.

CHEESE again had a heavy turnover, the other States continuing to purchase here. Prices eased during the month, but with shortened production values have already firmed, present quotations being from 9d. to 9\frac{3}{4}d. per lb. for large to loaf.

BACON.—Sales are still rather on the slow side, and there is little alteration to report in this line excepting that prices are a shade easier than a month ago. Best factory cured sides, 1s. 3d. to 1s. 3dd. per lb.; hams, 1s. 4dd. to 1s. 5dd. per lb.

HONEY.—Prime clear extracted is scarce, and values are a little lower, quotations being 4½d. to 5d. per lb. Beeswax continues very saleable at 1s. 4½d. per lb.

ALMONDS.—Stocks are only light, and very few consignments seem to be reaching the market, Brandis selling at Sd.; mixed softshells, 7d.; hardshells, 3d.; kernels, 1s. 4d. per lb.

LIVE POULTRY.—Although consignments during the month show a decided increase, competition has continued keen, and the high rates previously reported have maintained. Supplies are still very short of requirements, especially in view of the Christmas demand. Geese particularly are in strong request at tall figures. At the close of the month prices were:—Good heavy-weight table roosters, 4s. 6d. to 5s. each; nice conditioned cockerels, 3s. 9d. to 4s. 6d.; plump hens, 3s. to 4s.; ducks, 3s. 6d. to 4s. 6d.; geese, 7s. 6d. to 8s.; pigeons, 9d. each; turkeys, from 1s. 3d. to 1s. 5d. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—Old season's potatoes are now off the market. Local requirements have been met by supplies from the Adelaide Plains, although quantities offering so far have not been sufficient to effect any material lowering of price. It is generally expected that supplies will be better from this out, and therefore it is reasonable to suppose that values will be easier. ONIONS.—Recent climatic conditions have been very favorable to the growth of onion crops, and new season's supplies are now offering in large quantities at very low prices. Quotations:—Potatoes (new), £11 per ton in the market; onions, £3 10s. per ton in the market.

THE ENGLISH MARKET FOR DRIED FRUIT.

Writing under date October 7th, the Trade Commissioner for South Australia in London says:—"Phenomenal values are now ruling for sultanas, and the Australian crop this season is bound to realise splendid prices. There is every indication, now that the Balkan States are involved in the war, that prices for dried fruits are likely to remain at the extremely high values ruling at present for some considerable time. The position here to-day is summed up in the following report, which I have received from a dried fruit salesman:—

Currants.—The small remaining stocks of old fruit were quite cleared before the arrival of the s.s. Fabian, and as this vessel's cargo consisted chiefly of medium and lower qualities, the major portion of which had been sold to arrive, there was a lack of that animation which is usually experienced at the opening of the new season, and the market was inclined to drag, but the firmness of the Greek market and the insistency of growers that fully a third of the crop had suffered through rain, together with some feeling of anxiety as to whether Greece would be drawn into the war, and shipments of the fruit thereby be restricted, quickly made buyers realise the uncertainty of the situation, and we closed the past month with an exceedingly strong tone. Samples of the Iyria and the Aikaterini, now arrived, are being eagerly awaited.

The Maronian has sailed, and the Belgravian is loading. The small spot business done in the Fabian's cargo was at the following prices:—

 Spot quotations—
 33s.

 Pyrgos quarter-cases
 33s.

 Pyrgos quarter-bags
 31s. to 32s.

 Amalias and Patras
 34s to 38s.

Gulf 40s.

Statistics to 4th October:—

1915.
Tons.

1914.

Valencia Raisins.—We are now in October, and no trade of importance has yet been done. Reduced estimates of the yield are still coming in from Spain, the latest being only 4,500 tons. The Giralda and Vinifreda opened the season with about 38 tons, and this small quantity found a ready outlet at 62s. to 66s. for half-boxes, 67s. to 72s. quarter-boxes, and 65s. to 70s. seedless. The Herakles is now discharging further supplies. California seems likely to in part supply the shortage; arrivals from that quarter have met with a ready sale at reasonable prices. The arrivals to October 4th, including transit fruit, are 216 tons; to same date last year, 320 tons—a decrease of 104 tons.

Sultanas.—The values continue to advance, and the small remaining stock of Smyrna fruit is being quickly absorbed at extreme prices, up to 95s. having been paid. A few Greeks of the new crop, ex Fabian, realised 100s. A fair business was done in Californian, sulphured and oil-bleached, but very few of these can be here before November, so for the present the trade will have to chiefly rely on what stocks are left of old Smyrnas and new crop Greeks. Arrivals of Smyrna, to October 4th, including transit fruit last year were 15,982 packages. This year there is nothing.

Figs.—It will be impossible to supply the place of Smyrna fruit, which, of course, cannot be shipped this year, because no other sources of supply can furnish figs of the same quality, but Algerian, Californian, Spanish, and Portuguese figs are likely to be sold at prices altogether higher than can be obtained in a normal

WHEAT HARVEST.

OFFICIAL FORECAST, SEASON 1915-16.

The official forecast of the wheat harvest for the season 1915-16 has been issued by the Statistical Department. The estimate is compiled from reports dated November 20th, 1915, and gives the total grain yield for the State as 27,275,229bush., an average of 10-92bush. per acre sown.

The area under wheat during the year under review is given as 3,192,907 acres, as compared with 2,842,020 for the preceding season. It is anticipated that of the area under crop this year 2,497,768 acres will be reaped, 665,175 acres cut for hay, and an area of 29,964 acres is set aside as likely to be fed off or as having failed.

The quantity of hay to be cut is given as 9.9,369 tons, an average yield of 1.47 tons per acre. The figures tabulated are as follows:—

	Tot	tal Area under Wheat for Grain, Hay, &c.					Estimated Area for Season 1915-16.				
Division of State.	Actual 1914-15.		Esti- mated 1915-16.		Increase		Grain.		Hay.	Failures and Fed Off.	
I. Central II. Lower North III. Upper North IV. South-Eastern V. Western Total for State	830 273 329	0,687 0,845 0,901 0,894 0,693	Acre 1,024, 944, 316, 379, 528.	501 531 160 420 295	Acres 124,81 113,68 42,25 49,55 20,60 300,88	14 36 59 26 02	Acres. 709,57 768,03 233,90 330,73 455,52	70 33 00 37 28	Acres. 310,061 173,848 68,990 47,561 64,718	4,870 3 2,650 0 13,270 1,122 5 8,052	
	Estimated Producti					on, 1915-16.			Moan Average		
Division of State.			Grai		n.		Hay.		1	per Acres of Good Seasons—	
		Υ	ield.		erage Acre.	Z	ield.		verage r Acre.	1903-4 to 1912-13.	
I. Central II. Lower North III. Upper North IV. South-Eastern V. Western	er North er North h-Eastern		Bushels. 7,615,096 10,610,133 2.239,290 3,431,872 3,378,838		Bushels. 10-73 13-81 9-57 10-38 7-42		Cons. 52.712 98.745 85,079 59,224 73,609	Tons. 1·46 1·78 1·23 1·25 1·14		10.977 12.900 8.17 9.15 7.257	
Total for State			27,275,229		10.92		79,369 1.47		1.47	10.28	

HINTS TO NEW SETTLERS IN IRRIGATION AREAS.

FOREWORD.

The members of the Berri Branch of the Agricultural Bureau, having noticed the mistakes made by new settlers amongst them—mistakes that have led to much loss, both in time and money—decided that a few hints from those who had been through the mill, or were still undergoing the refining process, might be acceptable to some of the newcomers. As an outcome of this three members of the Branch (Messrs. F. R. Arndt, W. R. Lewis, and A. P. Wishart) were requested to write papers, giving such information as might be acceptable to newcomers, and the following pages have been compiled with that object.

SELECTION OF BLOCK.

Those wishing to make new homes for themselves on one of the irrigation areas along the River Murray should, before taking up a piece of land from the perusal of a Government plan, take a trip up the River, and view the land for themselves. There is nothing like seeing the country to enable one to judge its possibilities. Should the wouldbe settler not be able to inspect the land at the time, the next best thing for him to do is to get an experienced irrigationist-one with local experience for preference—to examine the land for him, and follow his advice. Even the experienced irrigator will value such advice. By this means, should the prospective settler be destitute of irrigation experience, it is possible for him to make a better choice of a piece of land than if left to his own judgment. The best plan, however, would be for him to view the land, examine the depth and nature of the soil and subsoil, in company with an experienced local irrigationist, who could point out to him the merits or defects of any block.

As the greatest drawback on an irrigation area is the menace of seepage, land that presents many hollows, or that has a heavy subsoil, should not be chosen. Seepage is brought about by the irrigation water running along the top of the compacted subsoil and coming to the surface, where this subsoil is shallow—or even meets the surface of the ground. Blocks situated on sandy rises, which shelve out on to clay flats, are liable to develop seepage, which will show itself along the line just above where the clay and sand meet. Land that contains hollow basin-shaped depressions should also be avoided, for unless the subsoil of such depressions consist of deep sand, the water from the

surrounding higher lands will soak into the hollows and gradually kill the plants it contains. A block of land having deep soil of a uniform nature, with a not too tenacious subsoil, and having an even slope, is about as good a proposition as one should require.

Another thing the prospective settler must consider before finally making his choice is the size of the block. Providing he wishes to work his land by his own labour, this will greatly depend on what he intends to grow. For dairying purposes a block of about 20 acres, of a fairly flat and even nature, which will not require too much grading before it can be planted to lucerne and other fodders, will be found about right. For fruit-growing, a block of from 10 to 15 acres is quite large enough for one man to manage successfully. Newcomers selecting land for fruit-growing almost invariably make the mistake of choosing too large a holding. It is folly to suppose that one man can successfully look after more than 15 acres of fruit-trees and vines on an irrigation area. especially as the trees attain age. Good livings have been made at fruit-growing on 10 to 12 acres of land, and for the man of limited capital, a block of such an area will be found most convenient. For the growing of vegetables, an even smaller-sized block would suffice: and should a market be found for them, as where railway communication is available, a 5-acre block should yield a living. Those settlers having 25 to 30 acre blocks, who find that they have more land than they can manage, would be wise to part with their surplus land to newcomers, and throw all their energy and capital into their remaining land.

WHAT TO PLANT.

The new settler will, no doubt, have made up his mind upon the chief lines he intends to plant. Upon some points, however, he may feel some doubt, and a few words upon the different varieties of trees and plants usually grown in an irrigation settlement may perhaps be of use to him.

So far settlers have gone in but little for dairying on the irrigation areas of the Upper Murray Valley. This has been partly due to the fact that fruit-growing has been a fairly profitable proposition, partly that the means of transport to Adelaide and elsewhere have been slow and uncertain, and partly that a great portion of the land has not been suitable for growing fodders. With the advent of railways tapping the river valley, the problem of quick and regular transport will be solved. Those desiring to adopt dairying should choose a level block, having loose and friable soil. Such a block will require but little grading to prepare it for lucerne paddocks, and lucerne will thrive well in loose loamy soil.

With regard to fruit-growing, the chief lines usually grown on the irrigation areas along the Murray are currants, sultanas, apricots, peaches, nectarines, pears, and oranges. As there is already an over-production of Australian-grown currants, it is not advisable to plant more land with this class of fruit at present. Sultanas have also passed the limits of the Commonwealth's consumption, but there is a limited market for them in England, although the prices obtained there have not been satisfactory of late. As there has been for some time a good demand for spirits, a number of the riverside growers are planting some of their land to the Doradillo grape. This is a very heavy cropper—yields of 10 to 12 tons of fresh fruit to the acre from trellised vines being not unknown. The Renmark average of dried currants is somewhat over 1 ton to the acre, while sultanas average slightly under the ton.



Natural Scrub, Berri Irrigation Area.

After having been condemned for some years, the apricot seems once more to be coming into favor. This is largely due to the fact that a good demand for Australian dried apricots is now arising in England. It is not advisable, however, for the average grower to plant many acres of apricots, as this fruit ripens during the hottest part of the year, often so rapidly that, unless many hands are employed in harvesting, a great portion of the crop is lost. As it is not always possible to procure the necessary labor at the right time, the average grower should not plant more land to apricots than he and his family, with perhaps an occasional hand or two, could manage to harvest—say from 2 to 4 acres.

Peaches and nectarines are grown to a considerable extent on the irrigation settlements. Up to the present the Australian markets for these have been good and the prices satisfactory. But there does not appear to be room for great expansion with these fruits, as Californian dried peaches are at present sold on the European markets at prices with which the Australian grower could not successfully compete. The best varieties to grow for drying purposes are:—Peaches, Early Crawford and Elberta; nectarines, Goldmine and Stanwick.

The pear also does well on the Murray. The Bon Chretien, or Williams (also known locally as Duchess) variety has been the chief kind grown so far, as it is equally well suited for drying or canning; and, with railway communication, can easily be forwarded to the Adelaide market fresh. The Glou Morceau, a late variety, has also done well under irrigation, and ships well; whilst Josephine de Malines, Beurre Diel, Madam Cole, Doyenne du Eunice, and Packham's Triumph are other pears that should do well along the river.

Of all fruits, the orange has, perhaps, been the most extensively planted along the Murray Valley during the last few years. The Washington Navel is the variety usually chosen, but Thompson's Improved, Navelencia and Golden Nugget Navels, Jaffa, Valencia Late, and the firmer skinned varieties of Mandarins are also worthy of being tried. Orange trees should be planted on the best land of the holding, where there is good drainage. As it takes about seven years from the time of planting for the orange tree to produce profitable crops, the grower would do well—unless supplied with sufficient capital—not to plant too large a portion of his holding with this fruit. Through the enormous plantings that have taken place, navel oranges must certainly come down in price in a few years, but if a big export trade can be worked up with Europe, there is every reason to think that this branch of the industry has a bright future.

Of fruits not so extensively tried as the foregoing kinds, and which seem to offer a promising field for investment, are the prune and apple. The former, after being neglected for some considerable time, is once more being planted in Mildura. Some of the best varieties are Fellemberg, Prune d'Agen, Robe de Sargent, Splendour, Sugar, and Old Black French Prune. Experience has taught that a single variety of prune does not fruit well if planted by itself, as some of the varieties are self-sterile. Two or three kinds should therefore be planted together. After the first two or three years the trees should be pruned but little, as it has been proved that along the river the prune will not bear satisfactory crops if cut back to any considerable extent. The prune succeeds best on a very heavy soil.

The Government Horticultural Expert, Mr. George Quinn, thinks there is a good future before the apple along the Murray. Such varieties as Cleopatra, Jonathan, and Dunn's Seedling ripen about two or three weeks earlier along the Murray Valley than they do in other cooler parts of this State. Hence, for export to Europe, they would be in better condition to place upon the market before the bulk of the Australian fruit, and should thus realise satisfactory prices. Under irrigation the fruit is usually of a larger and more uniform size than that grown under other conditions. Hence, most of the fruit is up to export sample. The greatest advantage, however, that the local applegrower has over his competitors in other parts of the State is that the Upper Murray Valley in South Australia is comparatively free from coddin moth and other diseases of the apple.

Should the grower wish to have a few side lines, almonds and walnuts may be tried. The former prefers a fairly loose and dry soil, and should not be over-watered. It is considered that almonds are benefited by cross pollination, hence different kinds which flower at the same time should be planted together. Ne Plus Ultra, Hatch's Nonpariel, and IXL fulfil this condition, as do White Nonpariel and Peerless also. Those desiring to try walnuts should be careful not to plant the English variety, which is unsuited to warm districts. In California Franquette and Mayette are now being planted in the warmer regions of that State, and these would probably do well here. These two varieties should be planted together, about 40ft. apart on the square, as they pollinate each other, and they could be interplanted with short-lived trees, such as peaches.

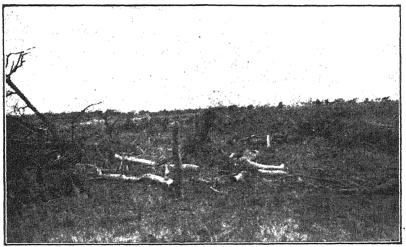
The average settler would be wise not to put all his eggs in the basket by planting all his land to the one kind of fruit. By having a block of mixed fruits he will not be rushed by having everything ripening at the same time. The harvesting apparatus (drying racks, trays, cases, &c.) need not be so extensive as if only one class of fruit were grown, as the same material may be used over again for each different kind of fruit.

The grower who cannot plant all his land in the first year would do well, unless he has a liberal supply of capital, to plant those varieties which come into bearing earliest—such as vines, apricots, and peaches—the first planting season, leaving the slower bearing varieties—oranges, pears, and prunes—for the second year. By this means his land will yield him some return while the other trees are coming into bearing.

PREPARING THE LAND FOR PLANTING.

The cost of grubbing and clearing will vary greatly with the class of land selected. Porcupine grass alone could be cleared for 10s. per

acre; bluebush and sparsely timbered areas, £1 to £3 per acre; mallee land, from £3 to £7 per acre, according to the density of the natural timber, and assuming that a grubbing machine is used. Settlers would be well advised to save all timber suitable for firewood, even at a little extra cost. To erect a good substantial fence, with gum or box posts 12ft. apart, with two plain wires, one barbed wire, and 42in. netting, would cost approximately £60 per mile. If all roots have been run when grubbing, and the holes filled in, the usual price for good deep ploughing is £1 per acre. The cost of grading will vary considerably, but on nearly every block some expenditure will be necessary to effect the uninterrupted flow of the irrigation water.



Scrub Grubbed with the aid of Tractor and Cable, Berri

AREA A SETTLER IS FINANCIALLY COMPETENT TO BRING UNDER CULTIVATION.

Under this heading it is desired to give some idea of the costs covering a period of four years from planting. The cost of grubbing and clearing, &c., has been enumerated, and the following figures are approximate at per acre:—Trees such as peaches, apricots, apples, and pears, will cost delivered £4; pegging out and planting, 10s.; cultivation, £20; water rates, £6; rent, 14s.; pruning, £1 6s.; total, £32 10s. For oranges add £14 per acre. This is made up by the extra cost of the trees, one year's additional water rates, and rent, as oranges return little under five or six years. Total, £46. For vines, per acre, over a period of four years:—Cost of vines, £1 15s.; pegging and planting, 10s.; cultivation, £20; water rates and rent, £6 14s.; trellising, £15; pruning, £2; total, £46. Other costs.—These would include 2 horses.

£40; dray and harness, £20; disc cultivator, £11; plough, £4 10s.; single horse cultivator, £2 10s.; total, £78.

Some return would be received at the end of three years in some of these varieties of trees and vines, but if it covers the cost of drying trays or racks, sulphur boxes, sweat boxes, and other requirements to deal with the fruit, a settler might consider himself on the highway tosuccess.

To properly execute the necessary work on a block of 15 acres would keep one man fully occupied all the year.

LAYING OUT THE LAND FOR WATERING.

After clearing and ploughing the land, the next thing the settler must do is to have his irrigation channels put down. This work is usually done by the Irrigation Department, the settler directing where the channels shall go. Where the soil is of a loose sandy nature, as at Berri, the irrigation ditches are usually made of concrete, but where the land is hard and level, earth ditches have been successfully used. The average cost of concrete channels is about £3 10s. to £4 per chain.

The settler should exercise the greatest care as to where he has his channels put down, and if possible expert advice should be obtained. Upon the position of the channels will depend the length of the rows of trees and vines to be watered. Experience has shown that in loose sandy loam rows 5 chains in length are long enough, and that on no consideration should rows over 6 chains long be watered in one section. On hard flat land it is possible to water with longer rows than on sandy rises—but even here the rows should not be much longer. On loose soil the furrow system of irrigation is the only one that can be used. Therefore the water is flowing for a considerable time past the upper trees of the row before it reaches the lower ones, and the longer the rows the greater time will the water take to reach the end. very long rows the first tree will have had too much water before the last tree has had enough, and the top of the land will be liable in time to become waterlogged—to the injury of the trees. In any case, the surplus water will soak down the slope along the top of the subsoil, and should this in any place come close to the surface of the ground, the water will come up there in the form of seepage, bringing the alkalies contained in the soil with it, and killing the plants in its vicinity. Having short rows means, of course, much channelling, which greatly adds to the first cost of the place, but it will pay in the long run, in the ease with which the land can be watered and in the satisfactory growth of the trees.

Another thing to which the settler will have to give careful attention is to see that the channels are so situated that the grade is not too steep

On sandy rises a fall of one foot to the chain is sufficient, while anything under 4in. to the chain is too little. It is a mistake to water straight down steep slopes, as the force of the water washes deep gutters in the land at the top. The washed-out soil carried down by the water silts up the furrows, about one-third down the rows, causing the water to spread over the land at that place, so that very little water reaches the end of the rows. Where the land is hard, as on most of the flats, the grade along which to irrigate may be considerably less than upon sandy rises, as the soil absorbs the water far more slowly than is the case with looser land. The danger of watering along an almost level grade on loose sandy land is, that through the porous nature of the soil the water sinks in so rapidly that the tops of the rows get too much water before the bottoms of the rows have had sufficient. Unless the drainage of the land is excellent. such a system of watering will cause seepage to appear lower down the slopes in time to come. Thus it is not safe to water with a fall of less than 4in, to the chain on sandy rises, while on the hard flats such a grade, and even less, may be used with safety. Where the contour of the ground is such that the only way to water is to irrigate down a steep slope, the rows should be very short. Rows that have a grade of 1 in 30 or less should not be longer than 3 to 4 chains, the principle to follow being—the steeper the grade the shorter the rows. By this means the land can be watered with a small stream running down the rows, which, while strong enough to reach the end, is still not too strong to cause much washing of soil from on top. Long rows require a strong stream to flow along them to reach the end, and this on a steep slope washes deep furrows into the top portion of the land.

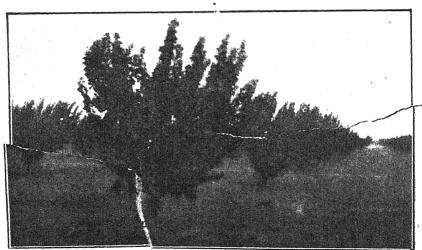
The settler who wishes to economise in concrete channels, and water out of earth ditches where possible, should see that his earth channels are situated on the lower portion of the slope, and, to prevent washing out, they should be run along a level contour.

The Irrigation Department also constructs concrete tanks for settlers. So far tanks of 10,000 to 15,000 gallons capacity have given the best results, as they are not so liable to crack as large ones. The land around a tank should not be irrigated, as it will sink, and cause the tank to crack. Thus the tank is best situated on the higher portion of the holding, where the land can be kept dry. Should it be necessary to run a channel past the tank, it should be concreted.

PLANTING, WATERING, AND CULTIVATION.

When pegging out, it is advisable to secure the services of some one with experience, for a mistake in the laying out of an orchard may mean perpetual extra expense in the working of it. The first row of

trees should not be nearer to the channel than 20ft., and perhaps better 24ft. (pears may be worked a little closer), but 24ft. is close enough for citrus, and 20ft, for all deciduous trees, to be planted in the rowsalthough Fellemburg prunes and almonds may be planted as low as 18ft. apart; but as some uniformity in a mixed orchard is desirable, 20ft, all round is a useful distance. Sultanas may be planted 10ft, x 8ft., or 12ft. x 8ft., currents 10ft. x 12ft., or 12ft. x 12ft. has been adopted for the distance between trees, then 10ft. between the rows of vines will give a more uniform appearance to the garden, as alternate rows will coincide with the rows of trees. In citrus planting, the roots must always be kept damp, and must not be exposed to the air more than necessary. The young trees should not be taken out in the garden and dropped one by one along the row of holes, and then covered with earth; but each tree should be placed in position as soon as its roots are uncovered, the roots spread out, and planted no deeper than in the nursery, water being given immediately. The



The Scrub's Successor, Berri.

trees should be "headed back" fairly low for preference. Trees not above 15in. from the ground having a nicely-shaped head should not be cut back to the last strong buds, but if the head is not really a good one the trees should be cut to the strongest buds on the main stem. With Washington Navels the head may be formed up to 18in. in height, but somewhat lower with all deciduous trees, even down to 9in., when strong buds are obtainable. If possible let the irrigation follow immediately upon planting; but if this cannot be arranged, give every tree a bucket of water—give enough, but do not overdo it,

and hoe as soon as possible, so as to aerate the soil. If the young trees show any sign of wanting moisture water between the irrigations: it will pay to do this, as it is necessary to get all the growth possible in the early years, and it is easier to keep them going than to start should be so arranged as to be able to water each tree quickly, giving each tree as nearly as possible the same amount of water. of the row should not be saturated while the other end is starved. An orchard, it should be remembered, may be destroyed as quickly by giving too much water as by too little. "Enough, but not too much," should be the motto. After watering there follows cultivation. The necessity for thorough cultivation cannot be emphasised too strongly. It is far better to conserve water when applied than to pour volumes of water on to the garden, thereby leaching out the plant food, and finally water-logging the soil and causing seepage, with its attendant evils. The best results will be gained, not on those blocks which have received most water, but on those that have been most industriously A minimum of water with a maximum of cultivation is a good rule to follow. The reducing of the water to an extreme, however, must be guarded against, especially when the trees and vines are laden with fruit.

In cultivation it is recommended to use two-horse cultivators, as on the whole deeper and better work is accomplished, and on an orchard of 15 to 20 acres, that needs to be cultivated 10 or 12 times a year at least, besides ploughing and other work, it would be rather a full task for one horse; but, in any case, cultivate deeply and often. Cover-crops will follow later, and on sandy land liable to drift or on wind-exposed positions a strip of some kind will be found necessary for the first few years, after which, except for manurial purposes, it will not be needed. As a rule strips of wheat are drilled down the centre between the rows in early winter, and these are cut for hay in spring, after which the surface is all cultivated.

In conclusion, this advice is tendered to new settlers. Do everything well; pay attention to detail; store up all the knowledge you can obtain upon irrigation; seek advice from men who have made irrigation a success, and have proved that they can make it pay; be careful of the man who has nothing to show for his knowledge, but who "knows all about it." Those who have spent a lifetime on the soil realise how very little they know and how much there is to learn.

TURNIP WEED (Rapistrum rugosum, All.).

By H. W. Andrew, Botanical Assistant, Horticultural Branch.

This year no weed has occasioned more discussion amongst farmers, the press, and in Parliament than the turnip weed (Rapistrum rugosum, All.). Growing in crops or in the orchard this plant is beyond question a troublesome weed. It is quite a common fallacy that a plant which has some known value cannot be a weed, and the term noxious weed in particular is generally associated with the idea of absolute uselessness, but as a matter of fact there are comparatively few weeds which have no value—and some of the worst enemies, viz., many poisonous plants, of the farmer and grazier possess valuable toxic principles of much use to the druggist.

A weed has been defined as a plant which grows out of place, and this, at least so far as the farmer is concerned, is a generally applicable definition.

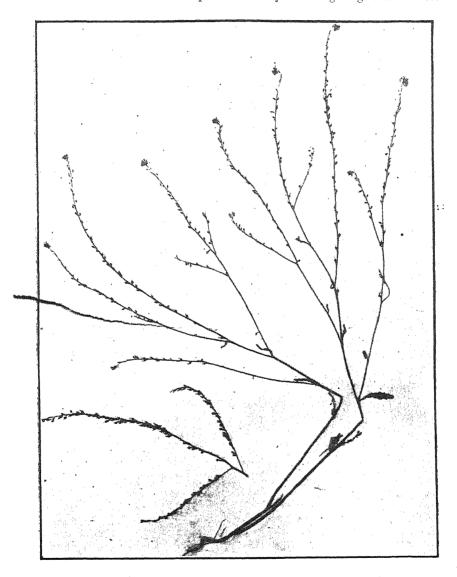
Rapistrum rugosum seems to be particularly prevalent this year in the wheat fields of the Northern districts and elsewhere, also in neglected orchards in this State. This is probably due in part to the delayed germination of the seeds on account of the drought of 1914 and the reduced number of sheep, which, as pointed out in last month's issue of the Journal by Professor Perkins, eat these cruciferous weeds.

This plant, variously called "turnip weed," "wild turnip," "mustard," and "giant mustard," is essentially a weed of fields which have at some time been cultivated, and more or less neglected. Mr. Colebatch, at the October meeting of the Advisory Board of Agriculture, said "the weed had been on the College farm for years, but it was only to be found on the roads. It had been worked out of the fields by cultivation and judicious grazing. On neglected land it thrives best." Specimens were measured in a neglected field at Knoxville this month which have reached a height of 8ft., but this is exceptional, while those on the roadside were much less vigorous. Where it thrives in wheat fields this weed usually stands higher than the wheat at time of harvesting. It bears hundreds of pods more or less closely distributed over the greater length of the numerous spreading or erect branches.

DISTRIBUTION.

Charlock and other cruciferous weeds are now widely distributed over the world, many of them being common adulterants in agricultural seeds, but Rapistrum rugosum is comparatively an unknown plant outside its native habitat (Southern Europe). Rapistrum is unknown in England, and apparently in the United States of America and Canada. Its limited geographical distribution without doubt is largely controlled by the nature of its pods, which do

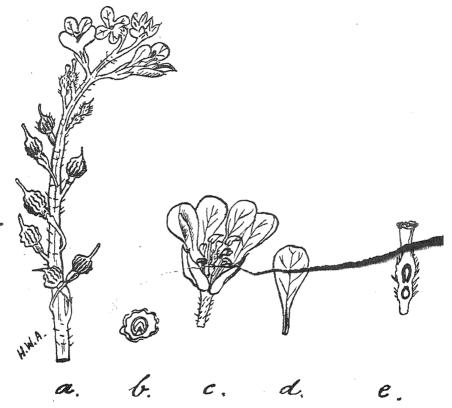
not split open (indehiscent) and the seed therefore cannot be introduced (it reached Australia years before any Federal or State control of imported seeds existed) into a country without the enclosing pod, which would be much too distinctive and conspicuous at object amongst agricultural seed



to pass unnoticed the scrutiny of seed analysts of the importing country. This is an interesting point illustrating the importance of inspecting seed supplies coming into a country or a farm.

PREVENTING THE INTRODUCTION OF WEEDS INTO NEW DISTRICTS.

Farmers, particularly in new districts in the mallee country, should make the most careful examination of samples of their seed supplies from outside districts to see that they are clean. If in doubt as to the nature of any weed seeds contained they could have such seeds identified at this office. Prevention is the best remedy. In such new districts a great deal might be done now and in the future in restricting the distribution of weeds from more



a Raceme showing appressed pedicels of pods; b transverse section of pod (cotyledons incumbent); c flower opened out a little; d clawed petal; c pistil in section (erect and pendant seeds).

settled parts. It is likely far more damage relatively will be done by weeds in these sparsely populated and stocked districts than elsewhere if no such control be exercised.

Description.

Rapistrum rugosum belongs to the same family as the "wild radish" or "white charlock" (Faphanus Raphanistrum, L.), and "charlock" (Brassica Sinapistrum, Boiss.), viz., the cruciferous or mustard family, which is of such

great economic importance, not only because of the number of weeds it contains, but because of the many useful plants it includes.

Many species of these plants have a distinctive flavor or odour in their stem, roots, or leaves, which help in their identification, but their floral members are singularly characteristic. The flower throughout the family typically consists of four free (separate) sepals and four free petals, the latter forming a cross-shaped flower which gives rise to the name of the family, cruciferæ.

The name "turnip weed" has been applied to this plant in allusion to the large turnip-like lower leaves, which may be 12in. long in the younger plants, but shrivel up in the more mature plants. The plant is downy or almost glabrous, up to 8ft. high, branches stiff, erect or spreading, upper leaves lanceolate, coarsely and irregularly toothed.

The flowers are yellow, but the plant is readily recognised by its small, roundish, and very numerous pods. The pod, which is tough and often downy, consists of two indehiscent joints, the upper one being round and wrinkled lengthwise, with one erect seed, the lower joint cylindrical, with one pendant seed (latter sometimes undeveloped), persistent style or beak awl shaped, about as long as the round upper joint. Pedicels or stalks about as long as the lower joint of the pod. The cotyledons (seed leaves) incumbent and folded over the radicle.



Near Bridgewater.

POULTRY NOTES.

By D. F. LAURIE, Poultry Expert and Lecturer.

HOT WEATHER AND PARASITES.

With the advent of warm weather comes the annual crop of reports of poultry ailments. While there are, of course, many diseases, and some due to causes other than parasites, still by far the greater number of cases reported prove, on investigation, to be caused primarily by parasites, and these are always active during the warm months. The poultry tick is by far the worst offender, and it is a wonder to me that so many people seem resigned to the fact and submit to losses which might be guarded against by a little effort. The proper eradication of all pests requires energetic action, and perhaps some people are indisposed to exert themselves. There are premises in various parts of the State so infested with tick that one wonders that white people in the 20th century are content to allow matters to remain. Just as the war has upset many ideas of the progress of so-called civilisation so the presence of tick-infested premises shows that evolution is slow, and that habits of universal cleanliness are still in the dim future.

Studies in parasitology, or the scientific study of internal and external parasites during recent years, has shown that many diseases of both man and domestic animals are transmitted through the agency of parasites. Parasites include the ticks, mites, lice (various sorts), flies, worms, &c. As regards the poultry tick, it is well known that it transmits the spirochaete (microscopic in size), which causes tick fever. The red mite is also held to cause fever from infection with the same or an allied spirochaete. Lice are known to convey various diseases from man to man, and there is no doubt that poultry lice are equally to be suspected as transmitters of poultry diseases.

THE STOCK DISEASES ACT.

By special proclamation, some years ago, various poultry diseases, including poultry tick fever (and consequently poultry ticks), were brought under this Act. At considerable cost the department printed and distributed many thousand copies of my illustrated paper on the tick and its effects upon poultry. Included in this bulletin were extracts from the Stock Diseases Act and Regulations. One would expect that writers on poultry matters would help in the work of eradication of this serious menace to the industry. Some of them, whilst professing knowledge in the matter, continue to advise the use of tick-proof perches, and ignore the fact that all owners

of property are required, under the provisions of the Stock Diseases Act, to report to the Chief Inspector of Stock if the poultry tick is found on their premises. They should also know that tick-proof perches are of little avail as long as the parasite remains on the spot. There is still much pig-headed ignorance about the tick, and many people, who never use a microscope and who never study life, prefer their own erroneous theories to ascertained facts.

SHORT LIST OF THE PRINCIPAL PARASITES OF POULTRY.

The Poultry Tick—one sort only.—Argas persicus (also called the miana bug, Persian poultry bug, fowl bug, Argas americanus, Texan poultry tick).

The Red Mite (Dormanyssous gallinæ) and one other sort recently named and only distinguishable by the aid of a microscope—Leiognathus morsitans.

These are noctambulatory—i.e., attack their hosts at night. Adult ticks do not remain on the bodies of the fowls, but depart after a feed. The larval form (six-legged) may remain attached to the host for a few days. Both ticks and red mites (they are not members of the mite family) live in cracks and crevices. Red mites may infest sitting hens and swarm over their bodies, even in day time. They are red or grey, according to the amount of blood contained in their bodies.

To destroy in woodwork, &c., use kerosine. In cases of adherent larval forms dip in kerosine emulsion (blood heat) made of boiling soapsuds to which 10 per cent. kerosine is added and emulsified.

There are many tick destroyers advertised, but in some cases the claims of their efficacy is founded on ignorance of the structure of ticks and mites.

Burn all infested woodwork, old barns, and old fowl houses. Make a thorough job of it; build sanitary poultry houses and see that the birds are clean and free from all parasites before they are removed to their new quarters.

Beware of old boxes, &c.—Many cases have come under notice where hitherto clean premises were infected through the medium of tick-infested boxes.

The old methods still survive, and in all directions one sees poultry sleeping in trees, on vehicles, piles of boxes, firewood, &c., all of which may become infested. Boxes are removed from place to place, and the tick which were hiding in the crevices soon find where the poultry are. If proper yards and houses were provided the poultry would be under control and so largely would the ticks be also.

LICE (Malophaga).

Large feather-eating louse (Goniocotes gigas).—These are seldom numerous, but for all that a few soon disfigure a fowl. Slow movers.

Large scurf-eating louse (Menopon biseriatim).—Long narrow body, yellowish in color, and quick moving.

Small scurf-eating louse (Menopon pallidum).—Very small, pale color and quick mover. These eat the scurf and outer portions of the skin and so cause intense itching and sores. They cause considerable mortality, especially among the male birds.

The above are biting lice.

Sucking louse (*Lipeurus species*).—These are generally found on the heads of fowls and chickens. They are grey and have long bodies and round long heads. They cause great mortality and undoubtedly convey disease.

All these live on the birds and pass from bird to bird, hen to chicken, and so on. All are destroyed easily by dipping in kerosine emulsion, sheep dip (half strength), or by free dusting with insect powder. Provide dust baths for the birds.

INTERNAL PARASITES.

Worms.—The round worm (Heterakis species) are quite common, and the tape worm (Taenia species) is also often found. The round worms are responsible for much sickness and mortality. Symptoms, yellowish diarrheea, sunken look about the head, face, and eyes, harsh plumage, and generally abnormal appetite. Give water to drink, but no food for 24 hours, then administer—(1) Santonine 1 part, ground areca nut 7 parts by weight. Dose—7 grains, or a heaped teaspoonful for 20 adults mixed in the mash. (2) Bickfords' worm paste—a teaspoonful for every six birds mixed with water sufficient for a short feed of mash. (3) Turpentine. Give with a long syringe with rubber nozzle—push this down gullet into the crop. Dose—1 teaspoonful per bird, or for six birds, in mash, use a teaspoonful. Large doses are less dangerous than small ones. Treatment should be repeated in a week; thereafter as a safeguard every three months.

BULLETINS.

With the exception of a few on the poultry tick, all bulletins on parasite diseases are out of print.

GENERAL.

Separate the sexes of your growing stock. Fatter and market all surplus cockerels.

Gather the eggs twice daily and market them without delay. Pen up all male birds so that market eggs are infertile. Do not sell stale eggs.

Fatten your sarplus chickens, &c., as there is a good market at high prices for all kinds of well-fattened young poultry.

The prospects ahead of poultry breeders are excellent. Look after the pullets. Eggs will be dear for a long time, therefore encourage your birds to their utmost production, but do not use spices or forcing foods. Avoid stale and tainted meat, or you will lose many birds.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, November 10th. Mr. F. Coleman presided, and others present were Messrs. T. H. Williams (Chief Inspector of Stock), C. J. Tuckwell, J. Miller, C. E. Birks, A. M. Dawkins, and G. G. Nicholls (Secretary).

PREVENTION OF FIRE.

The Secretary to the Minister advised that about 4,000 notices had been distributed throughout the State with a view of ensuring the adoption of adequate measures to prevent outbreaks of fire.

BULL FOR MURRAY BRIDGE.

A request was received from the Murray Bridge Branch of the Bureau that a bull should be placed on the Government farm there for use by the members, under the conditions specified in departmental communications. The matter was referred to the Director of Agriculture (Professor Perkins).

DESTRUCTION OF RABBITS.

In respect of a circular sent to the various Branches the Secretary stated that 28 of these had intimated that they proposed actively to combat the rabbit pest, and five had agreed to recommendations on the subject as follow:-Naracoorte.-Favor more energetic administration of the Act, together with the appointment of a Government in-Green Patch.—Holders of unoccupied land should be more severely dealt with; favor also appointment of Government inspector. Inman Valley and Port Elliot.—Suggest amendment of the Act to enforce simultaneous destruction between February 14th and 28th in Arden Vale and Wyacca.—Desire legislation to require complete destruction of burrows. At the instance of Mr. Tuckwell the Board decided to recommend to the Minister of Agriculture-"That the powers under the Vermin Act at present vested in the district councils be resumed by the Government." It was agreed that under existing conditions the destruction of rabbits was not conducted nearly so effectively as it should be.

STATE AID TO HORSEBREEDING.

The Coonalpyn Branch forwarded a rough outline of a scheme of State aid to horsebreeding, whereby the Government would purchase suitable stallions and hire them to settlers under the supervision of the Branches of the Bureau. Mr. Birks opposed the idea

on the score mainly that horses so obtained and distributed would enter into direct competition with those of the men who now paid high prices for good stallions, and independently of Government assistance were doing a great deal to improve the standard of the horses in the State. While sympathetically disposed towards projects having for their object the advancement of the welfare of the men in the newly settled districts, the Board, as a whole, felt that in the present state of the finances of the country it could not take any action in regard to the proposal put forward.

WOOLCLASSING.

A letter from the Registrar of the School of Mines (Mr. F. W. Reid) referred to the fact that during the shearing season the Wool Instructor (Mr. Henshaw Jackson) had been obliged to let his work at the station sheds stand temporarily in abevance in order to enable him to give addresses and demonstrations before Branches of the Bureau, and pointed out that in future, or at least until such time as an assistant instructor was appointed, it would be necessary for him to subordinate the work in connection with the Bureaubetween July and October-to instruction in woolclassing at the station sheds. Mr. Nicholls explained that Mr. Jackson's services to the Bureau were largely a matter of courtesy. They had unquestionably been much appreciated by the farmers, and exceedingly effective, but they made a particularly heavy demand upon his time. The Chairman thought the Board might take that opportunity of expressing its appreciation of the work which Mr. Jackson had performed in behalf of the Bureau and the Branches. He had always readily responded to requests for addresses and demonstrations, but they would realise that the School of Mines had the first call upon It was a significant fact, in relation to the general question of woolelassing, that (according to Mr. Jackson) 93 per cent. of the South Australian grown wool was in clips of 50 hales and under, showing the importance of the part which the farmers played in the great wool-producing industry.

DISTRICTS CONFERENCES.

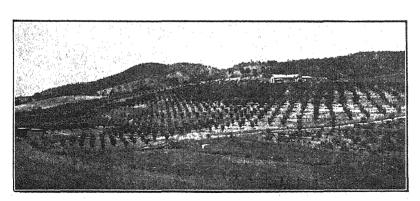
Mr. Dawkins having stated that the Gawler River Branch was prepared to undertake the necessary work of organisation, it was resolved to hold the annual conference of the Lower North Branches of the Bureau at Gawler early in March. The Secretary intimated that the initial conference of the Murray River Branches would be conducted at Renmark on November 23rd and 24th, and that the 1916 conference of the Yorke Peninsula Branches would be held at Kadina in March.

Approval was given to the formation of new Branches at Cygnet River and Rosy Pine, with the following gentlemen as members:—

Rosy Pine.—R. T. Hay, Wm. Townsend, A. Camens, R. E. Schiller, A. J. Gore, S. Baldwin, A. Baldwin, W. Baldwin, H. J. Russell, P. Russell, M. R. Schiller, L. Vaughan, J. Vaughan, jun.

Cygnet River.—H. A. Bauer, A. J. Weatherspoon, F. J. Wakelin, T. H. Waller, H. T. Noske, N. Brennand, R. Loader, C. T. Miller, W. A. Boettcher, J. Wright, A. W. Miller, M. Miller, F. Miller.

The following new members of the undermentioned Branches were approved:—Warcowie—S. Bennett; Dowlingville—Jas. Allen, S. G. Illman, W. H. Powell; Woodside—J. Hutchens; Georgetown—J. Rice; Clare—E. Phillips; Frances—C. E. Tapp; Inman Valley—Alex. McCoy; Borrika—O. F. Bauerochse, W. J. Buchanan; Mundoora—Roy Carman, H. Allen, W. F. Tancock; Milang—J. McMillan, C. Daniels; Naracoorte—Geo. Turnbull, W. A. Gericke; Clanfield—Eric Daws; Yeelanna—W. V. Bache; Parilla Well—E. Welden; Brinkley—A. Martin, J. Humphrey; Wilkawatt—A. Sumsion, K. Bowman, T. Sorrell, sen.; Moonta—T. H. Hooper, R. K. Kitto; R. K. Kitto, jun.; Renmark—N. McDougall, H. Oliver, A. Dawson, A. Townsend, A. Drover; Myponga—H. Ofield, A. Paul, C. Rowley; Bookpurnong East—E. Seilor, B. Schier, W. Hammond.



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Orchard, Near Clare.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of November 1915, also the average precipitation to the end of November, and the average annual rainfall.

Station.	For Nov., 1915.	To end Nov., 1915.	Av'ge. to end Nov.	Av'ge. Annual Rainfall	Station.	For Nov., 1915.	To end Nov., 1915.	Av'ge. to end Nov.	Av'ge. Annual Rainfall		
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.						
Oodnadatta		1.78	4.33	4.76	Spalding	0.36	19.84	19.36	20.25		
Tarcoola		3.32	7.25	7.58	Gulnare	0.20	16.89	19.00	19.74		
Hergott		3.11	5.39	6.04	BundaleerW.Wks.	0.16	17.38	16.34	17.29		
Farina		3.81	6.11	6.70	Yacka	0.27	13.68	14.56	15.27		
Leigh's Creek]	3.69	7.83	8.66	Koolunga	0 24	12.94	15.11	15.94		
Beltana		5.09	8.43	9.22	Snowtown	0.21	16.43	15.06	15.70		
Blinman		6.83	12.00	12.83	Brinkworth	0.08	15.24	14.78	15.48		
Hookina		10.04			Blyth	0.15	15.84	15.63	16.34		
Hawker	Lorenza	11.00	11.36	12-22	Clare	0.16	24.69	23.37	24.30		
Wilson		9.79	11.01	11.78	Mintaro Central .	0.20	29.58	21.08	21.99		
Gordon		8.31	9.63	10.26	Watervale	0.12	27.70	26.06	27.17		
Quorn		18.59	13.17	13.78	Auburn	0.14	24.67	23.27	24.25		
Port Augusta		8.34	8.95	9.46	Hoyleton	0.06	15.27	17.17	17.96		
Port Augusta W.		8.59	8.73	9.36	Balaklava	0.18	14.28	16.63	16.03		
Bruce		8.54	9.57	10.01	Port Wakefield	0.23	12.38	12.57	13.13		
Hammond	0.14	8.73 17.74	10.77	11.46	Terowie	0.16	10.35	12.72			
Wilmington	0.14	10.39	17.42	18·26 11·90	Yarcowie	0.12	11.96	13.10	13.91		
Willowie	0.09	22.57	11.30 22.14	23.04	Hallett	0.24	14.95	15.50			
Melrose Booleroo Centre	0.05	12.24	15.83	15.83	Mount Bryan	0.10	17.37	15.05			
Port Germein	0.06	12.56	12.11	12.84	Burra	0.19	20.07	16.99	1		
Wirrabara	0.13	22.19	18.07	18.91	Farrell's Flat	0.17	19.85	18.07	18.87		
Appila	0.06	12.45	14.11	15.08	W	M	D	~ ~			
Cradock		8.54	10.18	10.86	West of	MURRA	AY EAN	GE.			
Carrieton		11.53	11.34	12.22	Manoora	0.14		17.17			
Johnburg	0.01	7.59	9.46	10.21	Saddleworth	0.34	22.24	18.80	19.69		
Eurelia	_	10.92	13.24	13.24	Marrabel	0.52	23.82	18.11			
Orroroo		10.20	12.70	13.42	Riverton	0.37		19.68			
Black Rock	0.14	9.84	11.49	12.25	Tarlee	0.56		16.66			
Petersburg	0.08	10.97	12.22	13.07	Stockport	0.54	1	15.16	1		
Yongala	0.17	13.65		13.94	Hamley Bridge	0.59		15.61			
3	•	1		1	Kapunda	0.62		18.78			
]	North-	East.			Freeling	0.33		17.03			
Ucolta		8.23			Greenock	0.46	1	12.44	1		
Nackara		8.67	-		Truro	0.44	1	18.84			
Yunta		3.92	7.68	8.22	Stockwell	0.43		19.33			
Waukaringa		4.78	7.36	7.94	Nuriootpa	0.46		20.20			
Mannahill		4.21	7.83	8.46	Angaston	0.72					
Cockburn	-	4.36	7.45	7.97	Tanunda Lyndoch	0.38		21.31	1		
Broken Hill, NSW	-	7.52	8.83	9.63	nyndoen	0.39	24.81	22.07	23.0		
LOWER NORTH.					Adelaide Plains.						
Port Pirie	0.03	12.94	12.55	13.21	Mallala	0.29		16.10	16.8		
Port Broughton .	0.05	13.47	13.73	14.33	Roseworthy	0.11	20.64	16.53	17.3		
Bute	0.28	15.04	14.81	15.42	Gawler	0.29		18.37	19.2		
Laura	0.16	16.32	17.35	18.22	Two Wells	0.18		15.64			
Caltowie	0.24	13.58	16.32	17.27	Virginia	0.12		16.77			
Jamestown	0.11	17.65	16.47	17.46	Smithfield	0.06	1	16.54	17.30		
Gladstone	0.20	14.22	15:24	16.00	Salisbury	0.09	16.79	17.81	18.57		
Crystal Brook	0.18	13.64	14.82	15.62	North Adelaide	0.16	21.04	20.49			
	1 0 10	17700	17.42	18.32	Adelaide	0.33	19.32	1 90.10	21.04		
Georgetown	0.19	15.28		10.07	Titolalao	0.00	10.04	20.10	21.09		
Georgetown Narridy Redhill	0.19	13.28 14.60 13.84	16.00 16.07	16·79 16·79	Brighton	0.05	21.96 19.06	19.02	19.93		

RAINFALL-continued.

RAINFALL—continued.										
Station.	For Nov., 1915.	To end Nov., 1915.		Av'ge. Annual Raintall	Station.	For Nov., 1915.	To end Nov., 1915.	Av'ge. to end Nov.	Av'ge. Annual Kainfall	
ADELAIDE PLAINS—continued.			WEST OF SPENCER'S GULF—continued.							
Magill	0.36	25.53	24.53	25.69	Streaky Bay	-				
Glen Osmond	0.29	27.73	24.15	25.26	Port Elliston	0.04	13.56	15.31	15.31	
Mitcham	0.28	26.54	22.52	23.47	Port Lincoln	0.29	16.73 19.70	16.49 19.28	16·49 19·88	
Belair	0.36			28.64	Tumby	0.17	12.99	14.54	15.00	
					Carrow	0.21	13.27	1101	1000	
MOUNT LOFTY RANGES.			Cowell	0.05	12.56	11.29	11.76			
Teatree Gully	0.26	26.97	27.01	28.19	Point Lowly	0.03	10.09	15.60	12.21	
Stirling West	1.26	54.99	44.88	46.70			, ,		1	
Uraidla	1.07	55.63	42.59	44.35	**7					
Clarendon	0.42	31.62	$32 \cdot 26$	33.67	YORKE	e's Per	NINSULA	•		
Morphett Vale	0.24	21.65	22.36	23.32	Wallaroo	0.07	12.62	13.53	14.05	
Noarlunga	0.13	20.95	19.51	20.28	Kadina	0.26	15.10	15.33	15.88	
Willunga	0.21	19.53	25.07	25.98	Moonta	0.16	14.24	14.62	15.22	
Aldinga	0.19	17.91	19.47	20.34	Green's Plains	0.05	16.07	15.24	15.73	
Normanville		19.33	19.89	20.65	Maitland	0.36	21.54	19.36	20.08	
Yankalilla	0.05	22.20	21.91	22.78	Ardrossan	0.15	13.58	13.38	13.89	
Cape Jervis	0.17	11.21	15.71	16.34	Port Victoria	0.13	15.39	14.63	15.20	
Mount Pleasant .	0.69	30.01	25.89	26.87	Curramulka	0.25	18.96	17.90	18.51	
Blumberg	0.60	$32.28 \\ 34.82$	$28.26 \\ 32.01$	29·38 33·30	Minlaton	0.14	20.46	16.85	17.41	
Gumeracha Lobethal	0.82	40.05	34.13	35.38	Stansbury	0.10	17.67 17.29	16.51	17.06	
Woodside	0.63	39.38	30.73	31.87	Yorketown	0.29 0.05	14.90	17·15 16·89	17.47	
Hahndorf	0.57	34.27	34.16	35.45	Edithburgh	0.05	17.24	15.89	16.48	
Nairne	0.62	30.15	27.78	28.83	1	0 10	1 7	1000	1010	
Mount Barker	1.15	35.91	29.76	30.93						
Echunga	0.65	35.70	31.64	32.83	South A	ND SOI	OTH EAS	et.		
Macclesfield	0.71	32.44	29.64	30.72	Cape Borda	0.43	25.07	24.33	25.09	
Meadows	0.59	43.28	34.26	35.52	Kingscote	0.30	18.30	18.23	18.95	
Strathalbyn	0.33	18.33	18.52	19.28	Penneshaw	0.23	16.97	20.54	21.34	
					Cape Willoughby.	0.85	20.96	18.88	19.69	
Murray	FLATS	and V	LLEY.		Victor Harbor	0.28	17.03	21.35	22.18	
Wellington	0.15	12.84	14.25	15.01	Port Elliot	0.18	14.03	19.56	20.33	
Milang	0.10	10.77	15.44	16.08	Goolwa	0.23	14.91	17.22	17.93	
Langhorne's Brdg	0.05	10.15	14.53	15.27	Pinnaroo	0.24	12.64	15.80	16.74	
Tailem Bend	0.11	11.54		_	Parilla	0.15	12.30		1,	
Murray Bridge	().14	9.64	13.58	14.32	Lameroo	0.22	14.76	15.59	16.55	
Callington	0.25	13.60	14.94	15.65	Parrakie	0.12	12.93			
Mannum	0.10	8.25	11.14	11.67	Geranium	0.16	13.93 13.38			
Palmer Sedan	0.27	14.86	14.91	15.60 11.92	Cooke's Plains	0.15	14.43	13.98	14.74	
Blanchetown	0.10	6-12	10.06	10.71	Meningie	0.47	13.05	18-04	18.87	
Eudunda	0.71	19.35	16.44	17.33	Coonalpyn	0.51	15.51	16-55	17.49	
Sutherlands	0.25	10.71	9.99	10.60	Tintinarra	0.42	16.52	17-61	18.78	
Morgan	0.13	7.06	8.57	9.29	Keith	0.50	14.74			
Overland Corner .	0.10	6.79	11.42	11.42	Bordertown	0.50	1	18.62	1	
Renmark	0.05	8-14	10.93	10.93	Wolseley	0.38		16.84		
Loxton	0.15	9.41			Frances	0.40		19.47	1	
					Naracoorte	0.55	1		1	
West of	SPEN	er's G	ULF.		Penola	1.41	26.75			
Eucla	0.06			10.13	Lucindale	0.64				
White Well	0.00	5.96		9.67	Kingston	0.71				
Fowler's Bay		12.51	11.87	12.11	Beachport	0.90				
Penong	0.05			11.93	Millicent	1.06				
Murat Bay	-	8.67		-	Mount Gambier .	1.15				
Smoky Bay	_	9.76			C. Nrthumberland					
	1]	1]]		
					the country of the state of the					

THE AGRICULTURAL BUREAU.

CONFERENCE OF MURRAY RIVER BRANCHES.

The first branch of the Agricultural Bureau on the River Murray was formed at Renmark in 1890. The pioneering work in regard to the cultivation of irrigated areas was carried out here, and it was therefore most fitting that the inaugural Conference of Murray River Branches should be held at this centre. The settlement has passed passed through many vicissitudes; the settlers' experience, though ofttimes dearly bought, has been of great value, not only to themselves, but especially to those who are following on the more recently allotted areas. This branch of agriculture has its own problems—economic and cultural, and a noteworthy step in the direction of the solution of these was taken when representatives from the settlements from Murray Bridge to Renmark foregathered to discuss their difficulties.

In addition to the delegates mentioned below, the Director of Irrigation (Mr. S. McIntosh), the Secretary to the Minister of Agriculture (Mr. W. L. Summers), the Horticultural Inspector (Mr. George Quinn), the Poultry Expert (Mr. D. F. Laurie), the Dairy Expert (Mr. P. H. Suter), and the Assistant Secretary to the Advisory Board of Agriculture (Mr. H. J. Finnis) were present. Delegates:—Berri—Messrs. H. Barth, V. Cock, F. Arndt, W. Shand, L. Peacock, W. Pennefield, E. and J. Mitton, and W. Lewis; Waikerie—Messrs. T. G. Dowling, F. Binks Williams, J. C. Rowe, R. Stanley (Ramco), and F. B. Heartson; Kingston—Messrs. G. Holmes, F. J. Foord, and J. Weatherall; Murray Bridge—Messrs. R. S. Bell and G. Lyon.

On the morning of the 22nd November a visit was made to various holdings on the settlement. The visitors, with the members of the local Branch, were first driven to the homestead of Mr. H. Showell, where especial interest was evinced in the drying ground. The latest form of loose tray, having a framework of flat iron sides, and galvanized iron roofed rack, having supports of T iron, in which the trays were held, was installed. A drying rack, consisting of two tiers of netting, with a narrow alleyway between, and covered with one roof, was considered to be the most advanced type of rack which had yet been brought into use on the settlement. The undoubtedly fine orangery of Mr. C. R. Rose was the next place of call. The general appearance of the trees was distinctly pleasing, despite the slight evidence of damage by salt water last season. A system of drainage in process of installation was explained to delegates by Mr. Kate-

kar, Mr. Rose's manager. Similarly, on Mr. Cole's property, a good deal of attention was given to this subject, and here the visitors inspected the site of a system which was ably discussed in a paper read by that gentleman at the Conference. After an inspection of the No. 3 pumping station, a move was made in the direction of the very fine property of Messrs. Basey & Howie. The proprietors of this holding had given a great deal of attention to the growth of pears, and keen interest was taken in the many varieties which had been planted.

THE FIRST SESSION

The first session of the Conference was held on Tuesday afternoon in the Town Hall. The chair was occupied by the President of the local Branch (Mr. F. H. Basey), who welcomed the visiting delegates, and mentioned that this was the first occasion on which there had been a gathering of representatives of all the settlements along the River.

In performing the opening ceremeony, Mr. W. L. Summers said that in view of the number of Branches on the River, it was somewhat surprising that a Conference of this district had not been held prior to this. During the past few years he had had opportunities of coming closely into touch with the work of the Irrigation Department, and the more he saw of the Murray Valley the more immense seemed to be its possibilities, and it would be difficult for anyone to overestimate these from the point of view of production. There was one thing, however, which was going to govern the development of the Murray, and that was the question of markets. Two directions in which the Bureau system would be of use would be to enable them to give attention to what they would grow and the development of their markets.

They had with them to-day representatives from the newer settlements, and there was no question that they could and would benefit from experience that had cost the Renmark growers very heavily. This was one of the great advantages of the Agricultural Bureau; there was a community of interest along the River. At one time there was a feeling among a good many people that it was not a fair thing to expect a man who had bought his experience to give it for the benefit of his fellow cultivators of the soil. This idea had been knocked out, very largely from the fact that the failure to produce a good quality article was not only damaging to the producer of that article, but was also damaging to the producer of the better class stuff. One of their difficulties was the uncertainty of the oversea market for dried and preserved fruit, the production of which in a number of lines had already overtaken the local demand.

He then referred at length to the marketing difficulties with which the fruitgrower met, and expressed the opinion that co-operation would effect considerable good in this connection. There was no doubt, he said, that the Balkan trouble would have a considerable effect on the world's markets, and the present indications seemed to point to the fact that some of the products for which it had been difficult to find an export market at a profit would be saleable at prices almost above local parities. There were two dangers involved in this; unless the growers were loyal to their co-operative concerns, these organisations would suffer; secondly, if they raised the local price too high, they would meet the question as to whether the community should submit to an import duty, to give growers the opportunity, directly it occurred, of raising the prices.

ANIMAL PRODUCTS.

From the standpoint of the State, the hundreds of thousands of pounds that had been spent along the Murray were required to pay a return, and the whole question was the one of finding markets.

To his mind, more attention would have to be given to the question of animal products. Right throughout the world the one section of rural production that seemed to meet an increasing demand at increasing prices, was animal products of all classes.

One could not but be impressed with the immense area of country that was suitable for growing crops under irrigation. There were approximately 150,000 acres between Cobdogla and the border that could be classed as good irrigable land; and between Morgan and the border he felt safe in saying there were a quarter of a million acres suitable for irrigation. Judging by the productive capacity of Renmark, this strip of country could yield produce in value equal to that of the present wheat production of South Australia. Thus it could be seen to what extent the prosperity of the State was bound up in the River Murray.

Below Morgan there was also a very large area of country suitable for growing crops for animal production.

After referring to the usefulness of the Bureau, and the good which followed conferences of producers under its auspices, he declared the Conference open.

DISEASES AND DEFECTS OF FRUIT TREES AND GRAPE VINES

This subject was dealt with by the Horticultural Instructor, Mr. George Quinn, who stated that he knew of no phase of agriculture to which so much attention had been given during the past 30 years by scientific men than to pests of different kinds. For the earlier

progress that had been made they had to thank the Americans to a large extent, but their work on the whole was not so deep or searching as that of some of the European investigators. To-day, however, almost every disease was being studied by the most capable men available. The codlin moth, for instance, a native of Europe, although studied for 150 years, was not brought under practical control until an American suggested a remedy.

For the purposes of classification, the lecturer mentioned that the diseases and defects which were met with could be divided into (a) insects, (b) fungi, (c) bacteria, and (d) physiological troubles not attributable to any particular organism. It was well, he mentioned. occasionally to go back to the basic principles of the question they were studying, and in this connection he stated that true insects, for instance, belonged to a section of animals which had jointed feet, and bodies which were divided into segments, and whose life history involves several metamorphoses. They carried, as a rule, three pairs of true legs, and usually two pairs of wings. The distinguishing differences between insects and other kinds of minute animals was the manner in which the insect took its oxygen from the air, and the manner by which it obtained its food. The insect breathed through a number of tracheal vessels in the sides of its body, and in regard to the manner of eating there were two kinds, i.e., the mandibulate insects, which are solid food bodily, and the haustellate or suctorial type, which took fluids only in the shape of sap. These were divided up again into quite a number of families, the former into eight and the latter into five

There were also a number of small pestiferous animals which belonged almost entirely to the types consisting of creeping and spinning mites. These were readily distinguishable from the true insects, owing to the fact that they were not divided into bodily segments, but were covered by a continuous chitinous layer; but the most easily detected difference was the four or two pairs of legs which the adult mites always possessed. Members of this family were the so-called red spider, pear-leaf gall mite, and the Maori mite, which caused a brown russeting on the skin of the orange.

Of the fungi-causing diseases there were a great number. These were the vegetable, as opposed to the animal, parasites, but were placed very low down in the family of vegetables. The most distinguished characteristics of the fungi were that they had no flowers, seeds, or leaves, although they had organs more or less corresponding to these in function. Neither did they possess any coloring matter equivalent to chlorophyll in their structure, consequently they were unable to

utilise carbon from the air, and thus fungi were essentially parasites upon living or dead organic substances.

Preventive treatment was not based on any exact family classification, but on the methods by which the fungi attacked the host plants. In this respect there were two divisions of fungi-the exophytic and The former were those whose mycelial filaments the endophytic. and reproductive organs were produced upon the surface of the host plant, and only shallow haustoria or sucking processes were forced into the tissue, by means of which food substance, in the form of cell sap, was extracted. The common types of exophytes were mildews, such as the oidium of the grape vine, and the apple mildew. endophytes, on the other hand, were those fungi the vegetable functions of which were all performed within the tissues of the host, and only the reproductive stages were carried on upon the surface of the plant attacked. These, which constituted the more numerous and injurious branch, included the peach curl, apple and pear scabs, shothole fungus of stone fruits, black spot or anthracnose of the grape vine, &c.

He had not been able to trace any literature on the subject of bacterial attacks of plants further back than 1888. At the present, however, there were a few diseases which were attributable to bacteria, the principal being the pear blight, the mulberry blight, and the walnut blight.

REMEDIAL AND PREVENTIVE MEASURES.

Remedies for the insects, fungi, and small animals could well be classified under three headings, viz., (1) prevention, involving the avoidance of introduction of material, and the removal of all refuse. which might encourage the development of the pest; (2) circumvention, involving such matters as the introduction of blight-proof stock, etc.; and (3) artificial destruction by means of sprays, liquid and powder, and gaseous compounds. The first was very much a matter of administration of law, hence it was not necessary to dwell on this. In regard to the last, horticulturists had had the assistance of the scientists, and the mechanics had rendered great aid in the development of spraying appliances, which had been of considerable importance. The requirements in this connection were the maintenance of a heavy pressure, and in dealing with most kinds of trees, it was desirable to concentrate the spray so that it could be directed on to any limb or bunch of fruit as desired. Usually a comparatively coarse spray was better than a very fine one. Whether they were using a liquid or a dust spray, the better they could cover every particle of the trees the more effective would the work be,

All spraying remedies which had been suggested by scientific investigators for insect pests had been based on the method by which the particular insect took its food. If it chewed portion of the plant it was usually a simple matter to poison it; but if it fed through a small, needle-like tip, thrust into the fruit or trees, poisoning by means of spraying was not feasible. For the chewing insect, arsenic had been selected as a poison, for the reason that it could combine with other substances and so become insoluble in ordinary moisture, thus becoming innocuous to the tree or plant, and, in addition, could be ground into the finest-grained powder. These facts enabled them to distribute it in strengths so weak as not to endanger large animals or man, and at the same time destroy the insect in its early stages.

For the sucking types sprays of this nature would be found quite useless; consequently all remedies for these did not poison, but suffocated. Oil wastes were probably the most valuable, for the reason that the surface tension of most solids was very great in regard to oil, and by reason of this a drop crept over a large area of an insect's body. The use of powders had not received much attention in Australia, for the reason that they had not the suitable machinery for distributing them

FUNGI.

In the case of those fungi which spread their mycelial filaments on the surface of the plant, sulphur powder was a most suitable and satisfactory remedy. Systematic treatment with this, when the vines were bursting in the second leaf, and again when the flowers were opening, was regularly practised with satisfactory results. With the peach curl, and most of the plum family, they had that type which developed their structure inside of the plant tissue. When evidence of the trouble was noticed on the surface the fungus was usually advanced to the spore-forming or reproductive stage. treatment for these consisted in spraying each season to prevent their attack. These minute vegetable pests required the same amount of moisture and the same temperature to cause them to start growing as did the host plant, and this gave a cue to the time for the application of the treatment. If they sprayed their trees at the time that the flowers buds were beginning to open, they would check the development of the fungus. In certain cases a dressing of the fungicide applied as the leaves fell in the autumn also exercised a highly preventive effect.

FUMIGATING.

The presence of brown and black scale had been noticed in the district. The treatment of scales by means of gases had proved more satisfactory than any form of spraying on account of the

mechanical difficulty of otherwise reaching every part of the tree. The use of hydrocyanic acid gas had been found the best for the treatment of red scale, as this gas was the least harmful to the trees, and the most destructive to the scale. It could only be applied at night, or in comparatively quiet weather. If the temperature rose to about 85 degrees Fahr, on a close, hot night, even, they would burn the foliage of the trees.

There were also a number of boring insects (such as the cherry borer) which were found in this district. The simplest way to destroy these was to scrape away the sawdust-like burrowing usually found at the forks of the limbs of the trees, at pruning time, and inject some gaseous substance into the holes. When the holes were straight a wire might be thrust in, and the insect destroyed in this way. A piece of cotton wool damped with carbon bisulphide or a grain of carbide inserted into the hole before plugging it with clay was generally quite effective.

PESTIFEROUS MITES.

These were represented chiefly by the bryobia, commonly called red spider, but distinct from that pest. These usually rested in the egg form about the wrinkles of the bark during the winter, and began to hatch in early summer. The best remedies against mites found so far were spraying with heavy oil emulsions in winter, and with lime sulphur wash in summer. The addition of 4lbs. or 5lbs. of flour paste to each 100galls. of lime sulphur was most highly recommended in America.

Bacteria.—So far as experiments go no external spraying or gassing had proved of any particular use against these. The knife and fire had so far indicated that the bacterial diseases of fruit trees might be restricted to a great degree by their judicious application. The walnut blight in this State destroyed annually more than half the crop, and the disease would have to be grappled with either by elimination of the most susceptible trees or careful amputation of diseased twigs and burning of diseased fruits if the industry were ever to succeed. Luckily we had not got the pear blight, but we had the bacterium causing a disease on the black mulberry. This, fortunately, was not a valuable commercial fruit. In California the pear bacillus had wrought havoc to an important industry, and constant cutting out of diseased parts was resorted to with the utmost vigor.

Physiological troubles.—The defects arising from these were probably at present of greater importance in irrigation settlements than was generally imagined. To the presence of too much water, or concentrated salts, or consolidated subsoils might be attributed far more serious losses than to nearly all the other ailments with which he had

dealt. As these subjects would be dealt with in other discussions suffice it to say that until we learnt more fully the needs of our trees and vines in their relation to soils and elimates—more particularly in the physical and mechanical conditions requisite in the former for the healthy progress of plant life—we should continue to struggle with plants rendered more highly susceptible than need be to the attacks of injuries engendered by disease-producing organisms.

THE DISCUSSION.

A good deal of interesting discussion followed the address. Mr. F. H. Basey mentioned that the cherry tree borer could usually be got at with the small blade of a penknife. A wax match inserted into the hole was a good way of effecting the destruction of the pest.

In reply to Mr. Lewis (Berri), Mr. Quinn said, in relation to the relative cost of the operation of the spraying and the use of gas, that the initial cost of the outfit was very much greater in the case of the latter. However, one good fumigating was equal in its effects to three sprayings. They could get the gas to penetrate anywhere, but this was not the case with the spray.

Mr. Muspratt (Renmark) asked whether spraying would not have as good an effect as sulphuring. Mr. Quinn replied this would probably be the case, but many growers would not have the spraying Mr. McIntosh asked which spray used for citrus pests in the outfit. Torrens Valley had been found most effective. Mr. Quinn said the best results had been secured from the red spray oils. (Kingston) mentioned the occurrence of a bug on the stems of vines; this was identified by Mr. Quinn as the black scale. Mr. H. S. Taylor (Renmark) asked whether Bordeaux mixture was of use as a preventive Mr. Quinn stated that this mixture was a preventive of practically all fungus diseases, but lime sulphur was a much better Mr. Lewis (Berri) referred to the prevalence remedy for oidium. of cutworms. He had tried to poison them with bran, arsenic, and treacle, but without success. Mr. Quinn stated that at Mount Gambier poison baits had been sown over hundreds of acres with the idea of destroying this pest, and they took the poison readily. When purchasing Paris green they should be careful to see that they secured the arsenic compound. Mr. Basey had effectively dealt with the pest by tacking B.P. paper around the trees and painting this with axle grease and carbolic acid; this kept the caterpillars out of the trees.

At the close of the session feeling reference was made to the death of Private A. McIntosh (son of the Director of Irrigation), and the decease of Mr. E. A. Loveday, Surveyor-in-Chief to the Irrigation Department.

FODDERS.

The evening session was opened with an address by the Director of Irrigation (Mr. S. McIntosh), who prefaced his remarks by quoting from an American publication an article urging on fruitgrowers the wisdom of supplementing their incomes by recourse to other activities, particularly the raising of sheep, cattle, and pigs. It was pointed out that the market for fruit was somewhat restricted, whilst the demand for animal products was an increasing one, and there were few fruit farms which could not carry livestock. The same factors operated in regard to this State as was the case with America, the Director said. The growth of fodders for stock would receive increasing attention along the Murray irrigated areas, and in this connection lucerne could be regarded as a standard. He stated that 50 varieties of this fodder had been tested in South Australia, and as a result the most suitable for growth on the River districts were found to be South Australian lucerne, grown from selected Hunter River seed (Giant Upright Hunter River variety), Broad Leaf Tamworth (Hunter River variety), Selected Hunter River, Arabian, Selected Provence, and Selected Turkestan.

Soil intended for lucerne should be thoroughly cultivated to a depth of 6in., after it had been properly graded; fallow was to be preferred. Good under and surface drainage were both imperative.

On irrigated land it was advisable to sow from 10lbs. to 12lbs. of seed per acre, broadcast, with 1cwt. of bone super. per acre. The seed should be sown either in April, with a nurse crop, preferably barley, or early in September, without a nurse crop.

In a thin or inferior lucerne stand he recommended sowing barley or oats after the ground had been worked up in May. This would ensure good winter fodder supplies, and at the same time protect the lucerne from the cold. Annual applications of not less than lewt. of super. per acre should be made.

The first cut from the September sowing should take place when the plant was from 6in. to 9in. high. The second cut could be taken when the plant was coming into bloom, and subsequent cuts when from one-ninth to one-tenth of the crop was in bloom.

Whenever practicable, the lucerne crops should be irrigated every three or four weeks. It would be found that the increase in the yield would more than compensate for the cost of the special waterings. Annual hay returns of not less than 5 tons per acre should be expected. On the reclaimed areas returns of up to 12 tons per acre per annum had been secured.

Tests conducted at Berri had conclusively demonstrated that this crop could be grown on the dry lands with satisfactory results. The

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ground should be fallowed and sown with from 2lbs. to 3lbs. of seed per acre, preferably in April, with a light nurse crop of barley at the rate of 1½bush. to the acre.

Lucerne would be a strong factor in arresting drift on this class of country, and at the same time it would convert otherwise useless land into a good grazing proposition.

As a general rule, stock should not be allowed to run on any one plot of lucerne for a period extending over more than a week or nine days, and all lucerne plants should be allowed to bloom at least once annually.

Other fodders with which he had had experience were dealt with. African Wonder, which did not seed, but was grown from cuttings, planted in spring, was a good yielder of summer greenfeed. Westernwolth's Rye Grass, which could be stored as hay, should be sown in autumn at the rate of 2bush. of seed per acre. Grass, for green fodder, should be sown in the spring at the rate of 8lbs. per acre. For autumn-sown greenfeed the following could be tried:—Perennial Millet Grass, Milium Multiflorum, Oryzopsis Miliacea, Piptatherum Thomasi, Wei Grass, and Veldt Grass, all of which should be seeded at the rate of 5lbs, per acre. Prairie Grass could be sown by itself at the rate of 2bush. of seed per acre, or mixed with Westernwolth's Rye Grass. Philaris Bulbosa, sown at the rate of 3lbs. of seed per acre in autumn, could be utilised either as greenfeed or as hay. Teff Grass appeared to be a first-class grazing fodder suitable for dry lands.

WINTER FODDERS.

Berseem, sown in March, 10lbs. of seed per acre, should be grown on strong, rich soil only. It should be utilised as greenfeed, as it made poor hay. Skinless or beardless barley, which was one of the earliest winter fodders known, had given splendid results last season in the bed of Lake Bonney. It should be sown at the rate of 2bush. per acre in April. Cape Barley and Cape and Algerian Oats, for greenfeed, should be sown in autumn at the rate of 2bush. per acre.

SUMMER CROPS.

The fodders mentioned above could be followed by sowing from October to December the following summer crops:—Maize (Stowell's and Hickory King), at the rate of 1½bush. to 2bush. per acre; Japanese Millet, or *Panicum crusgalli*, sown on strong and badly-

drained soils only, at the rate of 10lbs. per acre; Sorghum Saccharatum and Early Amber Cane, at the rate of 20lbs. to 40lbs. per acre; Pearl Millet, 15lbs. to 20lbs.; Soudanese Millets and Dhouras; mangold, and beet.

It was not advisable to go in too extensively for Chou Moellier, rape, and kale, as there was generally trouble with the aphis.

General points of interest to be noted in connection with the growth of fodders under irrigation were dwelt upon. The advisableness of selecting strong well drained soils for lucerne was referred to. When crops were to be flooded, the lecturer said, the land required to be properly graded and thoroughly cultivated, and dressed with fertilisers before the seed was planted. Inferior seed should on no account be used, and over-stocking was to be avoided.

DAIRYING.

The Dairy Expert (Mr. P. H. Suter) then addressed the Conference. Dairying, he said, was one of the most profitable and certain branches of the agricultural industry. The market price of cows at the present time was very high, but this gave an indication of the value of these animals as producers. When they considered the area of land along the Murray that was suitable for dairying, they realised that the possibilities were tremendous. The Murray Valley alone would produce more milk, butter, cheese, &c., than the whole of the rest of the State.

Dealing with the growth of fodders for milk production, he stated that it was a mistake to give too much attention to lucerne, as it was necessary to give the animals a balanced ration, and a change of diet at intervals. A weak spot in the dairy practice of the State was the fact that the animals did not receive feed containing the necessary food constituents in correct proportion. A knowledge of the feeding value of different foodstuffs was of considerable importance to the dairyman. For the purpose of increasing the milk yield during the dry periods of the year the importance of bran was mentioned. The nutritive values of several rations were discussed, and the lecturer then dealt with the necessity for testing the dairy herd, and the importance of using well-bred bulls for breeding.

A number of lantern views were shown, and Mr. Suter explained the points of the different breeds of cows, after which a number of questions were asked, and replied to by the lecturer.

MORNING SESSION, NOVEMBER 24th.

The morning meeting was opened by an address dealing with the feeding of fodders by Mr. McIntosh. He dealt at length with various methods of handling the foodstuffs referred to in his address of the previous day, and treatment of the irrigation areas in relation to stock. With regard to sheep, he expressed a preference for the Border and English Leicesters, either pure or crossed with Merino-Lincoln, Merino-Shropshire, and Shropshire-Merino. For lambraising he favored the Dorset Horn-Merino. In regard to pigs he recommended the Berkshire-Tamworth cross for bacon, and the Berkshire and Essex for porkers. Reference was also made to the value of poultry and turkeys.

MARKETING FRUIT.

Mr. A. E. Ross, of the Waikerie Branch, contributed a paper on this subject, in which he said:-"The chief product of our River fruit-growing areas will probably be dried fruits in some shape or form. With the marketing of these we need not concern ourselves other than insisting that present methods shall be simplified improved. All that, however, is pretty sure to evolve from our present organisation, more particularly since the dried fruits industry will be one of the leading primary producing industries of Australia within a few years, not only as a direct wealth product from the soil, but as a huge employer of labour. It might also be worth while on the subject of 'marketing' to draw attention to the necessity for loyalty and true co-operation amongst growers. Our methods of handling the sale of our green fruits leave much to be desired, and it is beyond question that the three factors which have in the past largely militated against the development of a big trade in fresh fruit are:—(1) Distance from markets; (2) bad packing or unsuitable form of package; (3) haphazard methods of distribution. Railway connection with the capital has very much minimised the first disadvantage, and so soon as a suitable timetable can be arranged, there seems to be no insuperable difficulty on the score of distance. Bad packing is overcome by experience as to the right time at which to pick each kind of fruit so that it carries well without suffering in quality from being packed too soon. If we have learnt nothing else we have found that an ordinary fruitcase is of no use for packing and shipping highclass soft fruits. Trays answer in some ways, and even half-cases are more or less suitable for some classes of fruits. What is required is some form of package which will prevent bruising and at the same time is not so expensive as to make the return of empties imperative,

The danger of introducing pests in returned empty cases is too great, and the practice should be absolutely forbidden. As to our methods of selling our fresh fruit in Adelaide, the less said the better. This did not matter much while the industry was small, but with hundreds of new growers coming on the scene and a great increase in production, some co-operation and organisation must be introduced. A safe maxim is that 'the best of fruit in season should always be obtainable, but there should never be a glut.' To arrive at this desirable end it would be necessary to organise at both ends, viz., the place of production and the place of sale. It might be worth while to negotiate with the fruitgrowers' associations already formed round Adelaide with a view to their handling the whole business at that end, but only careful and exhaustive inquiry can finally settle the best course to pursue. Of one thing there can be no possible doubt, and that is that the River Murray Valley produces as fine oranges, apricots, peaches, nectarines, and grapes as any country in the world, and it is our business to let no difficulty prevent these magnificent fruits (and others unmentioned) reaching any market at which it is possible to deliver them."

SPECIAL RESOLUTIONS.

EXPERIMENTAL STATIONS.

The following resolution, submitted on behalf of the Renmark Bureau by Mr. W. H. Waters, and seconded by Mr. W. E. Muspratt, was unanimously carried:—"That this Conference of Murray River Branches of the Agricultural Bureau urges on the Advisory Board to impress upon the Government the great importance of establishing experimental and demonstration blocks on the River at the earliest possible moment for the purpose particularly of showing the possibilities of animal products, such as fat lambs, pigs, and dairy produce. It is also urged that a type orchard of a much more comprehensive character than at present exists should be established."

In speaking to the resolution Mr. Waters said it would be a serious matter if the present tendency to rely almost exclusively on the production of fruit in the irrigated areas were not checked. There was great need for experiment with fodders suited to the upper river conditions, and the establishment of an experimental farm at Cobdogla or some other suitable place was urgently necessary. Equally necessary was the establishment of stud dairy herds, whence settlers could rely on obtaining animals of proved milking ability.

LAKE VICTORIA STORAGE.

The following resolution, moved by Mr. Basey (Renmark), and seconded by Mr. B. Williams (Waikerie), was unanimously carried:—
"That this Conference of Murray River Branches of the Agricultural Bureau desires to place upon record its conviction of the pressing need of the utilisation of the Lake Victoria storage at the earliest possible moment, and respectfully urges upon the Government the paramount importance of proceeding with the work forthwith. That, pending the completion of the permanent works, immediate steps be taken to hold the present floodwater in Lake Victoria by temporary means."

In support, Mr. Basey said there was not an irrigationist on the Murray in South Australia who was not deeply convinced of the damage done to his property by the salty water of last summer. The effects of the salt kept on manifesting themselves on the trees and vines, and many growers were much concerned to know how to rectify the bad condition of their land and to bring about an improvement in the state of their vines and trees. It had been easy to get salt into the land, but it was a difficult matter to get it out again, and a further application of water carrying similar saline contents would be disastrous. Despite the great shortage of money he urged this work as of pressing importance. He trusted that in any case the Government would do some temporary regulating work. There seemed good ground for believing that the present floodwaters could be held cheaply. Good timber existed adjacent to where the temporary works were required. The possibility of the utilisation of the bridge across the Rufus as the nucleus of a temporary regulating weir appeared to be worthy of consideration.

PHYLLOXERA RESISTANT STOCK.

A good deal of discussion took place in reference to a proposal that the Government should be asked to inaugurate a nursery for phylloxera resistant vine stocks. It was eventually decided that the Renmark Branch should deal with the matter in a paper to be brought under the notice of the Murray Branches; the subject to be further dealt with at the next Conference.

(To be continued).

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^{*}No report received during the month of November. + Formal report only received.

‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings— January 12th and February 9th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

October 18th.—Present: nine members and four visitors.

Mr. J. Ryan contributed a paper dealing with the planting of an orchard. He said the land should be securely fenced with several wires and 42in. netting to ensure absolute freedom from vermin. The land, if possible, should have an eastern aspect, and should be cultivated deeply the season before planting. Apple and pear trees should be planted 20ft. apart, peaches and apricots about 24ft., plums 20ft., and citrus trees about 24ft. apart. In planting the trees, the roots should be spread out well, and all broken ones cut back. A double row of almond trees should be planted to act as a windbreak. In discussing the paper, Messrs. Jacobi and Burton said that it was better to have level ground for orchard purposes. They did not think almond trees were profitable as wind-breaks, as they removed too much plant food from the soil.

MORCHARD (Average annual rainfall, 11in. to 12in.).

October 23rd.—Present: 13 members. HAY-MAKING .- Mr. B. S. McCallum read a paper on this topic. He said that there was a tendency among farmers to leave the cutting of hay until too late in the season. A start should be made when the wheat was in bloom, as that allowed sufficient time for a good quantity of hay to be cut before the grain was ready for reaping. If the weather were dull or showery at the time of cutting, and the hay were somewhat green, the sheaves should be allowed to lie in the field for a few days before stooking. Stooks should be long and narrow, say four sheaves in width, two upright sheaves in the centre, and one sloped against them on either side. The time which should be allowed for the hay to remain stooked depended a good deal on the weather, but the stacking should be commenced as early as possible. The centre of the stack should be somewhat higher than the sides. When placing sheaves in position on the outside, they should be placed partly on the edge, as this would cause the outside part of the stack to settle down better than would otherwise be the case. When building the roof, two layers of sheaves should project over the side of the stack. This would cause the water from the roof of the stack to fall clear of the sides. Mr. E. J. Kitto said that the hay should not be cut while too green, as too much weight was lost in drying, and the sheaves became very loose and difficult to handle. Mr. Reichstein said that when some hay was cut green and some ripe, it should be mixed when stacking. Scriven preferred to have grain in the hay if it were possible, but where a farmer had to cut large quantities of hay, it was necessary for him to commence cutting early. Mr. R. Jasper thought if portion of the hay were cut early, and portion fairly late, a good average sample of chaff opinion that horses preferred green hay. When building stacks he had always placed the heads of the sheaves outward. Mr. R. Kitto recommended round ends in stack building. He found bound straw to be best for covering stacks.

CARRIETON, November 19th.—Mr. E. W. Radford addressed the members present, urging them to secure as members of the Bureau all the young men in the district with the object of interesting and educating them in farming pursuits. Samples of wheat were tabled by Mr. F. Kaerger.

MOUNT REMARKABLE, November 10th.—Fine samples of Cumberland, Bunyip, and Federation wheats were tabled by Mr. Giles. Discussion took place regarding methods of identification and eradication of noxious weeds.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BUNDALEER SPRINGS.

September 22nd.—Present: 14 members and 19 visitors.

The meeting was attended by the Director of Agriculture (Professor Perkins), who was plied with a number of questions by members. In answer to the first question as to the most profitable way of working small holdings of 100 to 200 acres, such as those on North Bundaleer Estate, dairying was unhesitatingly recommended. The next question was: "What cereal is best sown in rotation with wheat when cropping land every year?" The Director did not favor such a practice, as it would result in dirty land and decreased yields. He outlined a series of crop rotations following bare fallow to cover periods of three to five years. In rotation with wheat he recommended pease or horse beans. He stated that no cereal was suited to intervene between two wheat crops. The occurrence of black rust, eel worms, rust, and smut made it inadvisable to have the same crops on the same land year after year. It was best to follow a crop that tended to dirty the land by a crop that tended to clean the land. The best plan was to have the crop that cleaned the land, or bare fallow. By the adoption of different kinds of crops in different years the land was kept in good heart for the crop that followed. Barley tended to exhaust the surface layers of the soil. The wheat crop that followed it did not do so well. Oats should be sown before wheat; barley should be sown after wheat, say in June. With reference to using a roller on a growing crop, the Director considered that rolling should be done when the land needed consolidating or to induce a thin crop to stool out. Cutting and binding a crop and subsequently threshing was certainly advisable if sufficient labor could be obtained for the purpose and a sale could be found for the straw. By this practice a better sample would be obtained, as the wheat ripened in the stooks, and no grain was lost in falling out, as frequently happened in a ripe crop left for the harvester or stripper. The matter of making ensilage was dealt with at some length. The silo should be of reinforced concrete, above ground, and, if possible, built on the side of a hill to facilitate filling and emptying. Two siles of 50 tons each were preferable to one of 100 tons capacity. The sides should be slightly tapered to make the pit a trifle smaller at the bottom to overcome the shrinkage that occurred after the fodder had been put in. Only good sound feed of strong growth should be used, and should be chaffed first. Nothing that the stock would not eat in the field should be put in. Ensilage was easier to make than hay, and the best was obtained by using a good cereal crop, such as oats. The ensilage should not be too dry; in fact, there should be a good deal of moisture in the should not be too dry; in fact, there should be a good deal or moisture in the food stuff that went into the pit. Mr. Gerke asked for information regarding the uses of various manures. The Director said that superphosphate was practically the only manure that had given good results with wheat. Root crops, such as potatoes and mangolds, benefited more from the use of potassic manures. Mr. Symons asked whether there would be any advantage in using sulphate of ammonia with bone super or superphosphate. This, the Director said, was a matter for local experiment, as it might be found that the value of the extra viold resulting from it would not equal the extra cost of the manurial dressing yield resulting from it would not equal the extra cost of the manurial dressing. In reply to Mr. Gerke, the Director described the proper method of using stable manure. The manure should be built up in much the same way as a haystack was made, and should be surrounded with a drain. It should be kept moist, and after it was well rotted, should be used to bind loose soils; but dry new

manure should be used to loosen stiff soils. In answer to Mr. Forth's question concerning the eradication of the lucerne flea, Professor Perkins advocated the use of gas-lime, and concerning the effect of super on lucerne seed mixed with it, he expressed the opinion that the acid in the super would tend to kill the germ unless the soil was in condition to bring about immediate germination, as in his own experience kale seed so mixed for a week gave a very bad germination. Mr. Gerke raised the question of depth of sowing seeds. The Director advised sowing cereals lin. deep in heavy ground and a little deeper in sandy soils. Small seeds could not be sown too shallow, and in the case of lucerne seed he would sow it on the surface and simply roll it in; but that meant that the seed must be sown at the proper time of the year. In answer to Mr. Travers, the Director said he preferred to sow lucerne in the autumn. Whereas the growth obtained from lucerne sown in spring was not very great in the first year, that sown in autumn gave several good cuts, but the chief objection was the danger from frosts. He preferred thick sowing so as to get a good stand, and would use 20lbs, to the acre. Mr. Travers inquired as to the best manure for fruit trees, and was informed that stable manure was best if enough of it could be obtained. If super were used, 2cwt. or 3cwt. to the acre should be applied.

CRYSTAL BROOK (Average annual rainfall, 15.62in.).

October 23rd.—Present: 27 members.

The Hon. Secretary, Mr. M. P. Pavy, read a paper on useful and ornamental trees. He said that in view of the liability of the country to droughts they should take advantage of every means of providing food for stock. There were a number of trees the foliage of which was relished by stock, and those trees should be cultivated by stock owners. Lopped branches should be allowed to remain at the foot of the tree to afford protection to any seedlings which might take root. The mulga (Acacia anewra), wilga (Geijera parvifora), kurrajong (Stereulia diversifolia), and leopard tree (Flindersia maculosa) were four trees which could be recommended. Mr. Shaw suggested the tree lucerne as an addition to the names mentioned by Mr. Pavy. Members agreed that the planting of such trees should be encouraged, more particularly around the homestead and in waste corners of land, but reliance would have to be mainly placed on stocks of hay and other fodder for stock feed.

REDHILL (Average annual rainfall, 16.79in.).

October 19th.—Present: nine members.

IMPROVEMENT IN HARVESTING METHODS.—A paper on this topic was contributed by a member, who said that the shortage of folder during the recent drought was, to a great degree, due to the careless and wasteful methods of harvesting adopted during the preceding good seasons. He condemned the use of the combined harvester, because it was wasteful, and the sample of grain produced by it was not of the first grade. The saving of time and labor effected by the use of the machine was outweighed by these disadvantages. He favored the use of the stripper and motor winnower, or, as an alternative, the binder and thresher. It became more evident every day that the productive capacity of the farms would have to be increased, and the adoption of improved harvesting methods was one of the means to that end. A good discussion followed, in which the use of the stripper and motor winnower was generally favored.

MOUNT BRYAN EAST, October 24th.—Mr. H. Tralaggan read an extract from the Journal, dealing with diseases in horses. A good discussion ensued.

MOUNT BRYAN EAST, November 19th.—The evening was devoted to a social, and songs and recitations were rendered. A collection was taken up in aid of the Red Cross funds, over £5 being realised.

WHYTE-YARCOWIE, October 21st.—The Director of Agriculture (Prof. A. J. Perkins) attended, and delivered a lecture, and answered a number of questions put to him by members of his audience.

LOWER-NOR'TH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

MALLALA (Average annual rainfall, 16.88in.).

October 4th.—Present: seven members.

FUNGUS DISEASES OF WHEAT.—The following paper, by Mr. H. Catt, was read and discussed:- One section of fungi which includes a large number of cereal parasites, is known as the Ustilaginae, or smut fungi. They derive their common name from the fact that their spores are represented by masses of black powder of very much the appearance of soot. Their general life history is very much the same, and may therefore be described briefly, taking the loose smut as a type. The loose powder found in the field at harvest time falls to the ground in most cases. Much of it will adhere to the straw, and if this be used as litter it will find its way to the manure pit, and thus back to the paddock. The powder consists of a number of spores which exist in the ground as long as the weather conditions are favorable. In the presence of sufficient moisture, they germinate. If in a manure heap or liquid, they can live and bud like yeast cells. If the liquid dries up these spores are distributed about by the agency of the wind. The spores in the crop germinate by coming in contact with water of the autumn rains, and not because they find material on which they can live. They emit a long tube through which all living matter is concentrated, and this tube is on or near the surface of the ground. If it meets with a young wheat plant it has the means of penetrating the stem of the wheat plant at the collar, i.e., where the roots start from the stem. But it is only very young plants that can be affected thus. When it has penetrated the young plant, it subdivides into a series of mycelium threads in the tissues of the plant and the smut lives on the sap of the wheat plant, so that actually the parasite grows up with the plant. At this stage it does no harm to the plant; in fact, plants affected have a much greener color and more healthy look than those not affected. Moreover, the mycelium grows up with the plant, and those portions which were below die. In the case of a crop of barley very badly infected with smut, if this is cut rather late for green feed it will generally shoot up again and carry grain, and whereas the bulk of the crop may be smothered with smut, that portion will be free from it, showing that the mycelium was all in the portion cut As the crop ripens the mycelium threads concentrate in special portions of the plant. In the case of loose smut it is in the ears of the wheat, and on them are formed large masses of black spores which destroy the grain altogether. Wheat bunt, that type of smut smelling like rotten fish, stinking smut of wheat, differs from loose smut in that it develops in the grain of wheat itself and is later than loose smut. The grain of wheat does not burst until the head is reaped, so that the whole of the harvest may be more or less infected by a few bunted heads, as they are more or less broken in the harvester, and so soil clean wheat with which they come in contact. One can readily tell the loss of grain infected in the field. Firstly, the plants are often darker green, both in flag and head; later on the bunted heads stand erect instead of drooping slightly. If examined the grains affected with bunt are generally shorter, rounder, and more or less discolored. The botanical features of bunt are somewhat different from the other smuts. The life history is the same. The only difference is that the spore is actually on the grain itself, and that when it germinates it attacks immediately the plant with which it is in contact. Manure will also convey this to the soil. Flag smut (Urocystis occulta), wrongly known as black rust, in Europe is looked upon as being peculiar to rye, and outside Australia it has not been referred to as affecting wheat, although it is occasionally to be seen on barley, and also on some common grasses; with us it is found almost exclusively on certain varieties of wheat. At all events it is only on wheat crops that it does any damage worth considering. characteristics are as follows:-In a rather late spring the leaves seem to be marked with black lines running between and parallel to the veins the full length of the leaf. These lines are occasionally found on the sheath and even on the stem, very rarely on the ear, though in most cases plants affected with flag smut die off without coming into ear. If one breaks through the outer coating of the leaf it is found that these black lines consist of sooty spores like other smuts. Under the

They consist of three spores microscope these spores are quite characteristic. joined together with barren spores forming a crown around them. These spores cannot affect the grain of wheat of healthy plants in that neighborhood, as the affected plants die off long before the grain is ripe; so it is the ground that is infested, and plants sown in the same plot of ground are in danger of attacks in These spores germinate in the soil under the influence of moisfuture seasons. ture, putting forth several mycelia, and attack the young, germinating plant They can only penetrate the plant thus in through the first sheath of the stem. its very early infancy. It is noticed that some varieties are more susceptible, e.g., Gluyas. In the case of common, or summer rust (Puccinia graminis), if we take as our starting point in the cycle the stage that is most familiar to us we find towards midsummer on the flag of the wheat plant, long, red lines running parallel to the flag, and enclosing a fine orange-red powder, which represents the summer spores of the parasite. Under the microscope these spores seem to be attached to the flag by long, slender stalks, bearing oval-shaped spores. The arms are known as Uredo spores. They are blown about by the wind, and wherever they alight on the wheat plant, if there is any moisture in the shape of dew present, they germinate a stem, which moves along the surface of the leaf until it meets a breathing pore, which it penetrates, and immediately develops within the leaf a series of mycelium threads, which live on the leaf. Within five or six days this mycelium mycelium threads, which live on the leaf. thread is again producing Uredo spores, and thus they are continually being disseminated over the crop. This accounts for the suddenness of the appearance of red There are millions of spores being scattered over the field from a single starting point, and within a very few days of infection new spores are being pro-The mycelium itself is localised, i.e., it does not spread throughout the plant itself as with smut, but the points of attack on the plants are so numerous that the damage done is much more extensive. Towards end of summer, when the straw begins to whiten, wherever the red patches were to be seen on the flag we now notice black patches. This is the black rust stage, which, at one time, was supposed to represent a totally different parasite. The spores under the microscope are a different shape. They consist of a double cell, and these spores are what is known as Teleuto spores. They do not germinate, even if moistened, till the following spring. Existing as they do on the old straw, they will germinate either in the paddock or in the manure heap. These spores send out arms, on which are born new spores. These small spores are blown about by the wind, and fix themselves, not to a cereal, but to a particular kind of shrub known as Barberry, where they form on the young leaves golden patches, which in sections are found to represent receptacles which are full of small spores. These again are termed Accidio These Aecidio spores are blown about in the summer on to the wheat plant, where they give rise to the *Uredo* spores, or red rust. Occasionally certain steps in the cycle may be missed, and indeed, if this were not so it would be difficult to account for the prevalence of red rust in this country. So far as we know there are not any shrubs present to any extent capable of acting as a host to the Accidium stage, and the inference is that the summer rust must find some other means of developing in the spring, when the spores germinate. The view generally held is that Uredo stage continues on various rooted grasses throughout the year, and that the infection of a field will start normally from neighboring plants that are so affected. Takeall.—This term is an exceedingly loose one, which is made to cover a good many accidents to cereals, particularly wheat. The term is applied, as a rule, when the crop appears to die away towards early spring, as a rule, in circular patches, the area of which gradually increases. It has been noticed that usually the accident is more common where the soil is light, and particularly in soils of limestone formation, than is the case in heavy soil. Yorke Peninsula, as far back as the early '80's is a district where takeall has been prevalent. There are many cases in which these accidents may be traced back to special causes; e.g., cases of so-called takeall were more prevalent in the early days than now, and this very largely because the practice of one year's bare fallow before wheat was not availed of to the same extent as at the present. The ground was broken up in the early autumn, and the rain was not sufficient to bring about the requisite consolidation Rolling was rarely used, and the result was that the roots failed by the loose seed bed; there being insufficient connection between the surface and the Again, to a similar degree, when heavy crops of straw were buried under and not burnt, the soil might remain loose and open, even with a year's bare fallow. In this case we have not only a rather hollow seed bed, but also a medium in which

denitrifying phenomena work actively in the autumn, and hinder the growth of crops, which remain stunted and may even die off. These, however, point only to purely physical defects in the soil, which may be remedied by rational tillage. Within recent years, however, attempts have been made to restrict the meaning of takeall to the attacks of a special fungus known as the wheat stem killer (Ophiobolus graminis). Infection in this case comes from the ground. The presence of this fungus is easily detected by examining the bottom node of the straw. If one removes the sheath of the leaf that protects the straw, the internode beneath will be found to be discolored brown, whilst the surface of the internode is more or less Internally the straw is more or less rotten and studded with black pustules. The invectium of the fungus is to be found internally and externally, both When once a plant is attacked it begins to die off within on the straw and roots. three or four weeks, so that the majority die off without coming to head. edges of the circle, however, plants are noted which die back suddenly, even within a few days of ripening, leaving white heads, and these are plants that have become affected with the parasite late in the season. In spite of this, however, there is no doubt that the wheat-stem killer is responsible for many cases of takeall. The only effective method of dealing with it is to fall back on a change of crop. However, oats are practically the only cereal that is not liable to the wheat-stem killer. Indeed, the parasite is said to thrive on many grasses, e.g. barley grass; so, if a field is left out to pasture, it will still keep the parasite going. An oat crop is the best possible means of clearing the land of the parasite. It may do good to burn a lot of rubbish over affected patches to destroy any spores of a lot of rubbish over affected patches to destroy any spores of a disease induced by a fungus parasite (Clowreeps purpureo). It is found generally on rye, but has also been found on wheat, barley, maize, and rice, and a good many grasses. The fungus, which grows up with the plant, like smut fungus, and grasses that should be occupied by the grain. The ergot projects slightly beyond the glumes, and is of a deep violet color. It is of a horny nature, and is found in wet years in wet districts. The damage it does to the grain crops is comparatively little, as it can easily be screened out in cleaning operations. It is most dangerous in damp pasture It is poisonous, so must be screened out. lands, where it is sometimes on grasses. Here it causes abortion in cattle. some cases such land has to be abandoned until drained and freed from ergot."

NORTHFIELD (Average annual rainfall, 19in.).

October 14th.—Present: nine members and three visitors.

HOMESTEAD MEETING.—The meeting was held at the homestead of Mr. W. J. Dall. A tour of the farm indicated the good results to be obtained from thorough cultivation. A discussion took place concerning the possibility of intense culture of the plains between Adelaide and Mallala.

SALISBURY (Average annual rainfall, 18.57in.).

October 12th.—Present: 14 members.

Mr. E. V. Harvey contributed a paper on fruit trees. He said that where fruit trees were to be grown for commercial purposes, only those varieties which were suited to the soil and climatic conditions should be planted. For orange trees deep alluvial flats were to be preferred; the soil should be of a somewhat sandy nature, and have good natural drainage. When planting, the positions of the trees should be marked with pegs. They should be from 18ft. to 20ft. apart, the greater distance preferably, as the roots occupied a good area of ground. land should be deeply ploughed, and the holes dug 2ft. square by 18in. deep. roots of the young trees should be well pruned before being planted, and they should be well spread out in the hole. After covering the roots with fine soil, it should be trampled down and a quantity of water applied, the remainder of the soil should then be filled in. For deciduous trees, early winter was the best time for planting, as the trees were enabled to become established before the advent of Oranges could be planted at almost any time. During the first hot weather. year they required careful attention, regular watering and cultivation of the surface soil.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BUTE (Average annual rainfall, 15.42in.). September 21st.—Present: 21 members and two visitors.

HARVESTING AND FODDER CONSERVATION, -Mr. H. N. Paterson contributed a paper on this subject. He said that some preferred the stripper to the harvester for the sake of the chair, but he favored the harvester, as it was much the quicker and cheaper, especially when labor was expensive, and mostly unskilled. Some wheat merchants a year or so ago said that harvested wheat was inferior to wheat reaped with the stripper and winnowed with the big motor winnower. They also said that with the harvester a farmer could, and did, go out reaping an hour or two carlier than a man with the stripper; therefore the harvester wheat was damp when it was put in the bag, and thus lost quality. On the other hand, the man with the stripper could not work until the crop was dry, therefore his wheat was better. He had seen farmers out stripping in all kinds of weather, so long as the heads could be pulled off (it did not matter if it were raining), they would still go ahead, pulling it off, putting it in the heap wet or dry, and with a good deal of half-ripe heads in it as well. They said it would all thresh in the motor winnower. This wheat was far worse than tough wheat reaped with the harvester. A farmer could not reap with the harvester or reaper thresher when there was over a certain amount of moisture in the crop without throwing a lot of heads out on the ground, and this no farmers would willingly do. Some people favored the use of the header, and its use would become more general than in previous years. thought, however, that it was a dirty, wasteful, and expensive job at the best, for in most cases, where the average farmer used a header to cut his wheat, he allowed it to lie in the field till after harvest, then carted it and put it through the header and made a so-called stack of the straw (which was very much knocked about), very badly built, and in most cases never finished. The result was that it would lie in the yard for about three or four years, taking in all the rain, and rotting away until the owner put a horse in a dray and carted it out to fill up an old track or to stop a sand drift. In his opinion it would pay farmers in the future to bind a portion of their best crop each year. Although it might not be wanted for years, yet it was always safe to hold a reserve of good feed. Even in the best of years all the young stock, horses and cattle, would do a lot better for feeding. Although the stock might live on what they could pick up in the paddock, they would do much better on clean, dry feed in the autumn and winter months. He would advise farmers to cut enough of their clean wheat crops to feed all their idle and young stock without infringing on their hay stacks. He suggested cutting the wheat just on the turn, similarly as for heading, and stooking it down. By so doing it could be handled far more easily and without the loss of grain that resulted from stooking up. It should be stacked handy to the chaffcutter, and put direct through the chaffcutter and winnower. In this way the farmer could have the whole of the grain, and at the same time have a fine supply of good, sound fodder for all kinds of stock. Where a farmer had the usual engine power, this could be done with no more labor than there was needed for working the chaff-As he had used the chaffed and winnowed feed himself, he knew that a farmer could do all his seeding on this kind of feed, and using no hay or corn. He had done the whole of this seeding, and had nothing else to feed his teams on, doing heavy work both with the drill and the cultivator. If this principle were adopted in the country, he said, there need be no shortage of feed for stock.

DOWLINGVILLE, October 28th.—Mr. W. Whittaker read an article from the Journal dealing with the manufacture of ensilage, and members agreed that it was an excellent method of conserving any surplus of green growth.

WESTERN DISTRICT.

CARROW.

October 21st.—Present: 15 members.

DISK PLOUGHS.—In a paper with this title Mr. B. Gobell, jun., said the disk plough was the best implement to deal with dirty scrub land, as it did not block

up or drag rubbish, and there was therefore no loss of time with the team. It was effective in cutting bushes, and produced a nice level seed bed. He had found the disk plough to be fairly severe on stumps, and it was capable of ploughing harder land than the share plough. More draught could be successfully applied to it for treating hard ground than with the share plough. General discussion took place, and varied opinions were expressed regarding the merits of disk and share ploughs.

ELBOW HILL (Average annual rainfall, 11in. to 12in.). October 23rd.—Present: five members and two visitors.

HAYMAKING.—The Chairman (Mt. A. O. Chilman) read a paper on this subject. He said that a farmer should sow a considerable area with early varieties of wheat for hay, so that the hay harvest would be completed before the grain was ready for reaping. He recommended Golden Drop for hay; and it should be cut when the grain was in the milky stage. In a season when red rust was prevalent farmers would do well to cut sufficient for a two years' supply, as it would be of great value if the next season should prove a failure. Stooking should be done immediately after cutting, and the hay should be left in stooks for a fortnight before carting. Ten yards by six yards was a convenient size for a stack, which should be built Care should be taken to build the sides perpendicularly, and to keep the centre 2ft. higher than the sides. The Hon. Secretary (Mr. F. Freeth) favored cutting hay much greener than was the usual practice in the district; and recommended Golden Drop, Smart's Early, and Marshall's Hybrid. Mr. S. V. Wake also supported early cutting. In reply to a question by Mr. Beadley, regarding takeall, Mr. Chilman recommended early fallow as a preventive measure, or, if it were very prevalent, variation of cropping, sowing oats instead of wheat. Ensilage.—The Hon. Sceretary (Mr. F. Freeth) recommended farmers to make

ENSILAGE.—The Hon. Secretary (Mr. F. Freeth) recommended farmers to make a quantity of ensilage each year, as it would prove a valuable food for stock, particularly cows, in dry years or during any summer season. Mr. A. O. Chilman supported Mr. Freeth, and suggested the use of an old tank to hold the ensilage.

GOODE (Average annual rainfall, 12in. to 13in.). October 20th.—Present: 10 members and three visitors.

Mr. K. H. L. Will read a paper in which he emphasized the necessity for doing work thoroughly in order to prevent avoidable losses on the farm. said, should be substantial, with posts 12ft. to 13ft. apart, and a barbed wire along Netting should be securely fastened with wire. All scrub should be cut down cleanly, leaving no dry timber standing, so that implements could be safely used without fear of breakages. All implements should be periodically greased and oiled thoroughly, and once each year all woodwork and other parts should receive a good coat of paint. Harness, also, should have careful attention. All old hoop iron, wire, &c., should be put in a safe place, where it could not possibly cause in-All stables and sheds should be roofed with iron in order to jury to animals. minimise the risk of loss by fire. Mr. W. A. Stephenson said that all harness should always be put away under shelter, and should be kept well oiled. Mr. S. Will advised as a good dressing for harness, a mixture of tallow, neatsfoot oil and resin. Mr. C. Will advocated the establishment of a blacksmith's shop on farms, so that all minor repairs could be effected without delay and expense caused by having to call in the aid of the blacksmith. Mr. W. Folland suggested that essential duplicate parts should be kept on the farm, as they were not always available locally, and if breakages occurred considerable delay would take place before replacement Mr. N. Packer recommended the practice of keeping nuts and could be made. Mr. E. Stephenson also spoke in support of the bolts of various sizes on hand. paper.

KOONIBBA.

October 21st.—Present: 13 members.

CO-OPERATION.—The Chairman (Mr. J. Foggo) contributed a paper on this subject, in which he emphasised the advantages likely to accrue from a cooperative bureau system for the purchase of farm necessities and the marketing of produce. Considerable discussion took place, and it was decided to make further enquiries before taking further action. The meeting was adjourned for five minutes in respect of the memory of Mr. R. Temme, a former secretary of the branch.

PENONG (Average annual rainfall, 11.93in.). November 13th.—Present: six members.

HARVESTING.—In a paper on this topic Mr. J. P. Stiggants said that, before harvest time arrived, a thorough overhaul should be made of all machines it was intended to use. The crop should not be reaped until it was thoroughly ripe, and reaping should not be commenced too early in the morning if the atmosphere were He preferred a stripper and power winnower to a harvester, as the at all damp. latter required much more careful handling and left a great deal of rubbish in There was a vast difference between seed wheat cleaned by the harvester and that cleaned by winnower and stripper. He had proved by actual test that the latter gave a better germination. The small heaps of bags left by the harvester were more open to attack by birds than the single hear left by the stripper. The small heaps were less convenient for carting. The harvester did not separate the smaller grain from the plump, as did the winnower and stripper. Members unanimously preferred the stripper and winnower to the harvester. Mr. J. Oats said the cocky chaff saved by the stripper was a valuable asset in poor seasons, when the binder could not be used. He contended that the harvester could not be used earlier in the day than the stripper, seeing that the comb and beaters were exactly the same in each machine. The chairman (Mr. J. Miller) and secretary (Mr. O. J. Murphy) also spoke in favor of the stripper.

ROBERTS AND VERRAN.

October 19th.—Present: five members.

COLT-BREAKING .- A paper on this subject was contributed by a member. The writer said that colts should be broken in when four years of age. The colt should be secured in a crush pen, then rubbed over with a bag, and a halter should be put over his head. A surcingle should then be fitted on, and first one side and then the other side of the horse's mouth should be tied back by connecting to the surcingle with a strap. When satisfied that the colt was mouthed, a pair of reins should be put on, and the colt driven around for a while. A well-fitting collar should then be put on, and the colt harnessed to a log, which he should be kept pulling around for some time, and after being taught to lead, he should be tied up to a good post with a strong rope. On the second day and for a week after he should be harnessed with a steady team, and worked for a few hours only each day. For the first few times the colt was worked his shoulders should be bathed with cold water after unharnessing. Mr. W. Kunst said that control of temper was essential if the colt-breaker wished to be successful. Mr. C. Kunst favoured the breaking in of colts at an earlier age than four years. Mouthing should be effected by putting the rein on both sides of the mouth at the same time in preference to putting pressure first on one side and then the other. Mr. F. Masters and Mr. Hoar supported the practice of early breaking-in of colts. The Hon. Secretary (Mr. W. Sharman) said that colts should be accustomed to handling from the time that they were foals, and should be worked when two years old. The colt should be taught to "tie up" when quite young. For breaking-in he favoured using a 15ft. rein tied to one side of the colt's mouth; the colt should be driven around in a simple and the operation than repeated with the rein on the apposite side. in a circle, and the operation then repeated with the rein on the opposite side.

SALT CREEK.

October 23rd.—Present: 13 members and six visitors.

DISK PLOUGHS.—In a paper on this subject Mr. R. H. Hornhardt described the style of disk implement he preferred. Fallowing was best done with a disk plough with bridles instead of springs, he said. The most suitable sized implement for this work was an eight or 10 disk, to which plenty of draught could be attached without the team becoming too unwieldly. Mr. Guidera had found the work of the disk plough to be very satisfactory, and Mr. Abrook supported his remarks. Hornhardt said the disk plough did good work amongst weeds and rubbish, but he preferred a share plough for clear land. Mr. P. Searle recommended 20in. in preference to 18in. disks. In reply to Mr. Lee, sen., Mr. Hornhardt said that 10 horses could work an 8-disk plough on fallow land, but eight horses could work a 12-disk implement on stubble lard. Discussion also took place regarding the appearance of rust and 'takeall' in crops, and the application of superphosphate. References were made to the fact that Mr. McNamara had enlisted with the Expeditionary Forces for service at the front.

YABMANA (Average annual rainfall, 15.14in.). October 23rd.—Present: 10 members and one visitor.

Sore Shoulders.-In a paper on this subject Mr. L. Crittenden said that the care of horse's shoulders should not under any circumstances be neglected. The first essential was to have perfectly-fitting collars; this was often difficult in the case of a growing young horse, unless several collars were provided. A great deal of the trouble could be avoided by seeing that the draught on the collar was properly balanced. The collars should be kept scrupulously clean, and should be softened by hammering occasionally with a wooden mallet. Mr. J. F. Roberts found it a good plan to have one or more collars kept expressly for colt breaking; they should be soft and spongy, and fit the colt tightly, but not, however, so as to cause the shoulders to rub on the points. Mr. W. Dorey said that much trouble could be avoided by correct feeding. A bottle should be used to beat the stuffing of a collar, as it did not break the lining. Mr. F. A. Beinke said that the washing of a young horse's shoulders when the collar was taken off would help to prevent Mr. M. K. Frost recommended soaking a new collar and fitting it to a horse's neck while damp, so that it would assume the correct shape. Mr. S. Pengelly preferred leather-lined to check-lined collars, as the former did not absorb the sweat, and were easier to keep clean. Mr. A. R. Beinke feared that the soaking of collars would injure them, as the straw would not dry properly.

YEELANNA.

October 23rd.—Present: 10 members.

HAYMAKING.—In a paper on this topic, Mr. A. E. A. Skipworth advocated a reixture of wheat, preferably an early variety, such as King's Early, and oats for hay, as it was very palatable to stock. The binder should be tested a week before the hay was ready, he said, to be quite sure that it was in thorough working order. Care should be taken not to cut an oat crop whilst it was too green, or the hay was liable to be bitter. When cutting a large quantity of hay, the stocks should be fairly large, and composed of sheaves placed upright. The stack should be built on dunnage, which should be covered with straw, as the stack was then less likely to slip. A good straw roof would prove effective in keeping the hay dry. It should be kept in place by wire, with weights suspended from the ends. The stack should he east and west. If the eastern end were opened up first little loss would be occasioned by bad weather. Mr. Roediger would not sow oats and wheat together, but recommended mixing oaten and wheaten hay when chaffing. The Hon. Secretary (S. A. Wilkin) supported the practice of building upright stocks, fairly long, say, four sheaves wide. This allowed the air to thoroughly penetrate the hay.

KOPPIO, November 16th.—The meeting was devoted to the discussion of methods of dealing with the rabbit pest. It was decided to initiate a scheme for the payment of scalp money, other Branches of the Bureau to be invited to cooperate in carrying out the scheme.

KOONIBBA, September 23rd.—On the occasion of the annual meeting the election of officers took place and other business was transacted.

YEELANNA, November 20th.—A paper on "Colt Breaking" was contributed by Mr. S. A. Wilkin, and a good discussion followed.

EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES)

BORRIKA.

October 23rd.—Present; 17 members and four visitors.

Mr. G. Miell contributed a paper on general farming topics. He said that in the farmer's team there should be included a couple of mares to be used for breeding purposes, so that the older horses could from time to time be replaced by younger animals. Experiments with varieties of wheat should be conducted on comparatively small blocks of land, as untried varieties were sometimes unprofitable to grow; it should be the endeavour of the farmer to grow grain of high quality only. Barley was a very useful green fodder, and limited quantities of it could be profitably grown for grain. Oats also were of

high feeding value, both in the form of green feed and grain. Lucerne, maize, and other fodders could be grown with advantage, especially during the hot summer months, if water were available. Cows should be kept, not only for milk and butter production, but it would be found profitable to rear calves and market them. In connection with the keeping of cattle and horses, the matter of fodder conservation was most important; such fodder as straw should not be discarded, but should be stacked and protected. Pigs could very profitably be kept in conjunction with the cows, as they would utilise as food a quantity of material which would otherwise be wasted. Poultry required little labor and attention, and if properly fed would give good returns. Care should be taken to select suitable breeds either for laying or table purposes. Where water was available for irrigation purposes, vegetables and fruit-trees should be cultivated. Any waste from the fruit and vegetable garden could be fed to the pigs and poultry. The keeping of bees could well be extended. Not only did they give profitable returns of honey, but they assisted in the fertilisation of plant flowers. The keeping of sheep was most important. The practice should be adopted in new country as soon as the farmer was in a position to erect the necessary fencing and the necessary feed was available. Great care, however, should be exercised to avoid overstocking. The provision of blacksmith's and carpenter's tools would enable the farmer to carry out various jobs which would necessitate expense and loss of time if sent to a tradesman. Considerable discussion ensued. In reply to a question, Mr. Miell suggested Marshall's No. 3, Budd's Early, Gluyas, and Carmichael's Eclipse as most suitable varieties of wheat for the district.

BRINKLEY. October 23rd.

Care of Farm Implements.—In a paper on this topic, Mr. T. Humphrey said that it was most important to provide proper shelter for implements, as the effect of weather probably caused more damage than actual wear. In districts where building material was available, sheds with stone or concrete walls could be erected more cheaply than with galvanized iron, and the work could be successfully done by an amateur. In erecting concrete buildings, a lot of old iron material, such as barbed and netting wire, could be utilised for reinforcing the work, and a stronger and more lasting job could be done. A blacksmith's shop should exist on every farm, so that minor, although sometimes important, repairs could be properly and expeditiously carried out. The bearings of implements should be kept thoroughly clean and free from sand, and oil should be used freely. Mr. W. Pearson said that all parts necessary should be replaced in an implement before it was put away in a shed, otherwise the matter was likely to be forgotten. Mr. P. Pope recommended mixing black lead with grease for application to bearings liable to run hot. Further discussion followed.

CLANFIELD (Average annual rainfall, 16in, to 17in.). October 23rd.—Present: 11 members and one visitor.

Scrub Rolling.—In a paper on this subject, Mr. F. Hoffmann said the best months for rolling scrub were May, June, and July, as the scrub broke more easily in the colder weather than during the lot months. The heavier the roller the more effectively would the work be done, more especially in dealing with hig timber, as a good proportion of the roots would be grubbed and the timber crushed down, and less shoot-cutting would be required. It was important to arrange the draught so that the roller pulled straight behind the horses. If possible, it was well to work the horses without reins, as they were then better able to pick a pathway through the sticks and stumps, and were less likely to suffer injury. Strong chains and good belly bands were essential. In discussing the paper Mr. Marshall thought the rib roller had no advantages over the plain roller. Messrs. Wilkins and Orwell also spoke in support of the paper.

COONALPYN (Average annual rainfall, 17.49in.). November 19th.—Present: 10 members and four visitors

HOMESTEAD MEETING.—The first homestead meeting of the Branch was held at Mr. J. Hill's farm. The afternoon was spent in an inspection of the holding, and

the abundance of feed which existed impressed members with the advantage of keeping sheep. In the evening Mr. W. Bainger, of Tintinara, contributed a paper on "Care of the Ewe and the Lamb."

GERANIUM (Average annual rainfall, 16in. to 17in.). September 25th.—Present: Seven members.

Conservation of Fodder.—In a paper on this subject Mr. D. L. Lithgow said that the experiences of the drought should have taught farmers to make provision in the future for a recurrence of such conditions. In considering the question of conservation of fodder, the farmer should take into account the market values of different fodders, and not build up a reserve regardless of cost. It should be the endeavor of every farmer to retain on his holding a stock of hay sufficient for two year's requirements. The manufacture of ensilage should also have his attention in view of the fact that it was such an excellent fodder, and could be kept for an indefinite period. The conservation of cocky chaff and grains could The former, though having little feeding value in be effected by any farmer. itself, with the addition of grains would be found very serviceable. Cocky chaff should be stored in a shed preferably, but failing that, if well covered with straw, would keep satisfactorily for years. Oats were an excellent grain food, and in view of the fact that the crop did not act as a host for the "take-all" fungus, it should be grown more generally than was the case at present. Straw also could be easily stored, and would be of considerable assistance in tiding the stock over a period of food scarcity. Mr. Nicholls preferred pollard to outs for feeding with cocky chaff. Mr. R. Young recommended the addition of salt or molasses to straw when stacking. Mr. Pannell thought oats should be cut for hay where possible.

LAMEROO (Average annual rainfall, 16.55in.). October 23rd.—Present: 16 members and one visitor.

A paper was contributed by a member, who urged the adoption of mixed farming in order to increase the productive capacity of the farms, and secure regular returns, without employing labor. He advocated, more particularly, the keeping of sheep in conjunction with cereal growing. The farm should be divided into paddocks about 250 acres in area, which should be so arranged that they could be further subdivided. He would limit the number of working horses to eight, and for implements would have a plough and a cultivator; to the latter a seed-sowing attachment could be fixed, so that a drill would be unnecessary. He would only crop with cereals that area which could reasonably be done without employing labor, say one paddock of 250 acres. In a paddock convenient to the bore grasses, lucerne, and other fodders should be planted to be a continuous standby for feed and topping off lambs. The past year had proved that with the splendid water supply available fodders could be grown under the severest conditions likely to be experienced in the State. A couple of cows and sheep, according to available feed should be kept, a few good ewes for breeding, and the rest wethers, periodically disposing of them. Care should be taken not to stock too heavily, or the wethers would take too long to fatten. If worked systematically, the sheep would account for the shoots better than the slasher, because they nibbled them off as soon as they sprouted from the stump. Members agreed with the writer that mixed farming practices would have to be adopted; those with experience were well satisfied with the results.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.). October 23rd.—Present: 13 members.

Fencing.—Mr. J. Frahn contributed a short paper on this topic. He said fencing posts should be 6in. thick at the bottom and 4in. at the top. Holes for ordinary posts should be 2ft. deep, and for strainer posts 2ft. 6in. They should be erected 20ft. apart, with one iron dropper between them. Strainer posts should be placed 15 chains apart, and should be 12in. in diameter at the thin end. A 5-8in. bit should be used for boring holes for wires, as this would allow of the wires being drawn easily through the posts. A barbed wire, No. 12 gauge, should be affixed to the tops of the posts, the second wire should be 10in. from the top, the third 8in. from the second, the fourth 7in. from the third, and the fifth and sixth 6in. apart, the bottom wire being 7in. from the ground. Wires should be kept tightly strained. Members agreed that when creeks crossed the fence line, it was wise to have swing fences.

MURRAY BRIDGE.

October 18th.—Present: 18 members and three visitors.

IDENTIFICATION AND DESTRUCTION OF INSECT PESTS.—The following paper was contributed by Mr. A. R. Hilton: "'During recent years the necessity for dealing with insect pests has become very evident, and no one can claim to be a good gardener who has not considered how to deal with the enemies which attack his crops, and often render his labors of no avail. There are many reasons why cultivated plants are so subject to insect attack. Nature has a wonderful balance in animal, insect, and plant life. Certain classes of insect feed on plants; birds feed on the insects, and any interference with Nature's balance brings trouble. nately many of our insect-eating native birds have been destroyed, with the result that the insects on which they fed have increased out of all proportion, thus becoming a menace to the gardener. The continual growing of certain crops in one place has led to the insects that attack that plant congregating there; this in another argument in favor of crop rotation. In some cases the highly-cultured conditions under which plants are grown tend to expose them to attacks of their enemics, by depriving them of their natural hardiness. Also plants propagated We may from cuttings are less able to resist disease than those grown from seed. Two men take it as a rule that the better the gardener the healthier the plant. have gardens divided by a wall, and possessed of equal natural advantages. is it that while one's plants pass safely through the attacks of aphis, flea, maggot and mildew, the other cannot grow a turnip, or a presentable cauliflower because of the myriad that click and rattle as he passes down the rows. It is not a matter of fate, but due to the fact that one is a gardener and the other is not. For the orchardist and market gardener the use of insect and fungus remedies is a first essential to success, and most growers have now come to recognise this fact. While, unfortunately, there are pests and diseases beyond practical means of prevention, yet the majority may be held in check by the use of well tried remedies. To deal effectively with insect pests we should be able to recognise the various changes through which an insect passes, which are threefold. 1. The larva, when the insect is colored and has many feet it is called a caterpillar, when of a fleshy color is often called a grub. In the larval stage the insect feeds greedily, On reaching full size it spins a cocoon or and does much harm to vegetation. hides in the ground while it changes to the next form. 2. The pupa or chrysalis stage, which signifies that the insect is not fully developed. The change to the third form takes place by the cocoon bursting and allowing the perfect insect to 3. Imago, or perfect insect, which now grows no more, and usually dies g its eggs. By thus recognising the various stages of an insect's life after laving its eggs. we are able to destroy a caterpillar which may eventually become a destructive moth, or still more frequently, an apparently harmless moth, which may be the parent of a host of destructive grubs. For our purpose we may divide the pests which attack gardens into classes—(1) fungus diseases; (2) insect pests. As fungus diseases do not come within the scope of the paper, we will not attempt to deal with them here; they are worthy of separate consideration. Insect pests may again be classified under two headings—(a) the sucking insect (Hanstellata); (b) the biting insect (Mandibulata). To best cope with any pest, it is of great advantage to know its manner of life, food, &c. In this respect the work of the naturalist has been of great value. The sucking insect usually has a trunk or rostrum with which it pierces the plant, and then sucks out the sap. As a general rule it has a soft body and can be readily killed by spraying with some liquid which burns its tender body, or which so covers it with a film that it is suffocated. Among the very best remedies for sucking insects are tobacco water, kerosine emulsion, and red oil. The most destructive sucking insects of this district are red spider and red mite, which are both tiny insects found on the under surface of leaves, from which they suck the sap, and soon cause the leaves to become withered and sickly. They are very destructive in dry weather to the pea, turnip, and other garden plants; are readily killed by using kerosine emulsion, and usually disappear after frosts or heavy rain. Both the green and black peach aphides are very destructive to the young buds of the peach. The black appears first, attacking the buds and flowers. This year, on the unsprayed trees of this district, they are simply swarming. As they increase at an enormous rate, the spraying to be effective must be repeated until all aphis are destroyed. The green aphis appears later in the season, and its attacks are often mistaken for curl leaf. Both these insects attract the ants to the trees to gather the parent insects which otherwise winter on the stem below the ground.

cottony cushion scale has caused great havoc in California on the orange and lemon until the introduction of the ladybird kept it in check. It frequently starts on the Kennedya creeper. Remedy-Kerosine emulsion, sprayed on hot. Of the red and black scale of orange the latter is easily destroyed by kerosine emulsion, but red is more serious, and trees must be fumigated with a poisonous gas. In one case in Victoria this pest reduced the output of a grove from £1,800 to £120 per The cabbage aphis, usually known as cabbage blight, renders it very difficult to grow the cabbage family on the Murray Flats. It increases at such a rate that the cabbage plot soon becomes one mass of corruption if left unchecked. Naturalists say that one insect is capable of producing 150,000,000 in the course of The remedy is to dip the young plants in soapsuds, spray with kerosine emulsion at first appearance. When bad it is best to burn the plants. Treating infected soil with lime is of great value. The Biting Insects.—These live on the leaves, stem, or roots of plants, and may be killed by poisoning their food as we would poison rats or mice, though there are many exceptions to this rule. There are three poisons which have proved of high value. London purple, Paris green, and arsenate of lead. Probably the last-named is the best, as with it there is less danger of harming the foliage. Some insects, for example, the cut worms, hide in the soil, coming out at night to feed. These may be destroyed by a sweetened mash of bran and arsenate of lead, if small pellets are placed near the Others again are underground feeders, e.g., the cockchafer, and these present a difficult problem, as they feed on the roots. Then there are the borers, which live in trunks of trees; these may be killed by injecting carbon bisulphide. The value of lime is not fully appreciated either as a plant food or as a dressing before planting soils infested with wire worms. The most destructive biting insects of this district are the collin moth, with the treatment for which we are all familiar; and the cherry tree borer. This is a boring grub found in the mallee around Murray Bridge, from which it attacks the stone fruits, tunnelling in them, and causing branches to decay. It is easily recognised by the sawdust-like appearance at entrance of hole. The holes should be plugged up with twigs dipped in carbolic acid or carbon bisulphide. The wattle goat moth is a very common insect along the Murray, where it is commonly used as a bait for fishing. The larva is a huge graph that is very destructive to valuable timber; but at present it is not clear how it can be kept in check. The cabbage moth is the small ragged moth so often seen flying over the cabbages. Its eggs produce the small green caterpillars, which riddle the When disturbed it spins a web and drops to the ground. The remedy for this is tar water, which keeps away the moths. Hot water poured on the cabbages kills the caterpilars without materially harming the fleshy leaves of All useless cabbages should be destroyed, thus preventing them the cabbage. being a breeding ground. The wire worm, the hard yellow grub, whose parent is the click beetle, is very destructive to root plants such as the potato. It is very difficult to deal with. Birds kill many when the ground is turned up. A dressing of lime is very effective to infested soils. The cockchafer larva is the big fat white grub common in garden soils, where it does great damage to roots. Its parent is the brown beetle, which flies about at night, and eats the young tops of trees. This is another difficult pest to eradicate. It should be always Lime on the soil is effective. Cut worms are the earthkilled when seen. colored grubs which hide in the soil, coming out at night to destroy young plants, e.g. tomato. They do immense damage, and often escape notice. have a habit of curling up when touched. A poisoned mash will readily kill them; or, one may spray the plants with arsenic mixture. The potato moth is one of the worst enemies of the potato grower. In warm countries it has been known to destroy the entire crop. The moth is in appearance like the cabbage moth, lays its eggs on the potato leaves, and the grubs crawl down and attack the tubers. The remedy is to burn the tops of the potatoes after digging. If the grubs are bad, dig the crop early, and store the potatoes so that the moths cannot get at them. The banded pumpkin beetle, so destructive to leaves of the pumpkin family, is often mistaken for the ladybird, though it is much larger and longer in shape. Dusting the leaves with Paris green or spraying the plants with arsenate of lead will be found a remedy. In the discussion that followed Mr. McIntosh pointed out the fact that lizards greatly assist the birds in destroying insects, and he emphasized the fact that the teaching of Nature study in schools results in many cases in children protecting useful birds rather than destroying them.

PARILLA (Average annual rainfall, 16in. to 17in.).

October 22nd.—Present: 11 members. Mr. H. G. Johnston read a paper in which he made suggestions regarding the best way for a farmer to give his sons a start in farming. Some farmers were able to buy farms for all their sons, he said, but where that was not possible, the farmer might buy a farm for his eldest son, who would be required to pay back the money, which would be available for the purchase of a farm for the second son. He thought that when a lad was about 16 years of age, he should be encouraged and assisted to acquire a team of horses, either by buying foals or a mare or two and breeding from them. Another good scheme was to lend the lad a team to put in a few acres of crop, so that he could gradually collect a plant for himself. Members discussed the paper, and were generally in favor of helping young men to start farming in some such way as suggested.

PARRAKIE (Average annual rainfall, 16in. to 17in.).

October 23rd.—Present: 12 members. Mr. H. Diener contributed a paper in which he said that, in the majority of cases, farmers should secure a better return per acre than they did by following their present methods. The areas fallowed were too small, and the work was not done thoroughly. Stubble land should not be cropped except in special circumstances, and oats would give better returns than wheat sown on stubble land. When thorough cultivation and heavy manuring were generally practised, much better results would be secured. Crops suitable for green manuring, such as clovers, lucerne, pease, etc., should be grown, and farmyard manure should be collected and applied to the land. Mr. Jose supported the views of the writer of the paper, and said that mallee shoots could be better combated by sowing smaller areas and cultivating them thoroughly. Messrs. J. G. Temby, Gravestock, and Lewis also commented on the paper. The Chairman (Mr. A. J. Beelitz) also urged the use of heavier dressings of fertilisers, and instanced the results obtained at Wilkawatt by the application of 2cwts. of superphosphate. In regard to depth of fallowing, Mr. Diener recommended ploughing to a depth of not less than 4in.

Homestead Meeting.—During the month a homestead meeting was held at Mr. Beelitz's farm. The meeting was attended by the Director of Agriculture (Professor Perkins) and a good number of visitors, besides a representative attendance of Bureau members. After a tramp through the fields and garden, the company was entertained at tea by Mr. Beelitz. In the evening an address, which took the form of a reply to questions relative to the district, was delivered by Professor Perkins. Throughout the day also Professor Perkins replied to numerous questions regarding the working of soils in the district.

RENMARK (Average annual rainfall, 10.93in.). October 21st.—Present: 15 members and five visitors.

CINCTURING THE VINE.—The subject of cincturing the current and sultana vines was introduced for discussion by Mr. W. E. Muspratt, who stated that it was now thoroughly recognised that the operation of eineturing the currant vine was indispensable if the best crops were desired. He had tried topping as a substitute, and found it answer nearly, but not fully, as well. One of the oldest currant vineyards in Renmark, which had been planted probably for 27 years, had never borne a satisfactory crop until the vines were cinetured-certainly not more than a quarter of a ton of dried fruit to the acre. Of late years some of the heaviest crops in the settlement had come from this vineyard. The acreage to be done and the labor available were factors to be considered in determining the time to cincture. Roughly speaking, the larger the area to be attended to the earlier one would need to start. In his own case he had eight acres to do-just a medium-sized area-and his practice was to start when 5 per cent. of the caps were on the ground. Some growers thought this too early, but he had found that it was better to be early than late. Mr. W. H. Harrison, who had taught Renmark growers a great deal about the current, advocated starting to cincture when 75 per cent. of the caps had fallen, but in his own experience the only time he had had bad currant crops was when he cinctured late. Mr. Howie's experience, also, was in favor of early cincturing. stood that the advocates of late cincturing claimed that the number of "bucks" was reduced thereby. Mr. Muspratt believed the effect of the cincture lasted for about a fortnight. With regard to "buck currants," these seemed to occur much more

frequently in vineyards in the rainfall districts than on the river, but he did not know whether the time of cineturing had anything to do with it. In carrying out know whether the time of cincturing had anything to do with it. this operation, some used a pruning saw, some a hack saw, and some a couple of jagged table knives, and other patent devices. He thought all of these tools open to objection. Their use was likely to affect the vigor of the vine, and they were not adapted to good, clean work; crevices were easily missed. He found nothing better than the ordinary apricot pitting knife. He had examined a section of a vine stem which had been cinetured most carefully with a sharp knife, and even under such circumstances a black mark was discernible in the wood at a depth of a quarter of an inch. A single incision was more harmful than a double incision and the removal of a strip of bark, and it had the additional disadvantage of preventing the operator seeing how deeply he had cut, or how completely the incision had been made. The removal of old bark before cincturing was important, whether the single or double incision was to be employed. The old bark blunted the knife, and the operator had to exert too much pressure to get through it; he might not get through it, and if he did would probably cut too deep and injure the cambium layer. The first cincturing was always a difficult operation; the old bark was hard to remove from vines not previously cinctured, and vines were often will bark this operation. In his own case, though he had exercised great care, 1 per cent. of his vines died after their first cincture. The old bark should be removed by raising it either above or below the previous year's cincture. He used a simple tool of his own devising for his vines. This consisted of a piece of stout galvanized hoop iron, rolled up at one end to make a handle, and hooked back at the other end. The knife he used was the ordinary apricot knife, and the blade was sharpened like a razor-flat. It was most important that the blade should cut at a If the blade were held upward on the lower cut, and right angle to the stem. downward on the upper cut the bark was certainly easy to remove, but the cambium layer would probably come out with it. An absolutely straight cut was the The knife should always be pulled towards the operator, not pushed from This was especially the case for vines with crevices, for which it was necessary to bring the point of the knife into use. In most years the single incision acted successfully, but there were years in which it failed. Many growers used it, but personally he thought there was a good deal against it. There was nothing to show, with the single incision, whether the job was properly completed. A number of growers made a double incision, and left the bark in; but in this case also it was impossible to tell whether the work was properly done. He found the full double cut the best. The operator could see whether the cut was properly completed, and could also see what damage was being done. The season before last many vines in Renmark went off badly after cincturing. The reason was not definitely ascertained, but the most probable cause seemed to be the raising of the bark by the cincturing knife, so that rain got under it and affected the cambium layer. He regarded it at the time as a good argument for an absolutely square cut. with the most careful incision the cambium layer would be found darkened for half an inch each side of the cut. He removed a little more than an eighth of an inch width of bark. If the cut were made narrower than this the cambium layer would most likely be damaged, and the strip was hard to remove. He used a simple tool made of No. 10 wire, with one end chisel-pointed, to remove the bark strip. He always used waxed cloth to cover the incision. It kept the sun out, and as the vine expanded, the strip was pushed off. The cloth would not stick too well on a cold day. The strips he used were about three-quarters of an inch wide, and he gave them an overlap of 1½in. They were easily made. His formula for the mixture was:—3lbs. resin, 2lbs. beeswax, ½lb. fresh beef fat. About three times these quantities were boiled together in a kerosine tin. The cheapest of calico would do for the strips, but the lime should first be washed out of it. Having heated the mixture, two men were required for the waxing. A strip of calico, 6in. or 8in. wide, was dipped into the mixture. One man held a couple of boards across the top of the tin, and the other pulled the calico between them, holding it by the end not immersed. The wood should be smooth. The strips were hung up to dry for a few minutes before rolling, and the undipped end was snipped to give the desired width of strips for operating. These strips were torn off as and when wanted. They would not remain good for more than one season. Mr. Howie's plan was to tear off the strips and roll them into balls before going into the vineyard. A handy carrier for the waxed rolls and the cincturing tools was easily made by nailing a handle across a 10lbs. London layer box. This was useful for keeping the

cloth clean, and it was also advisable to keep the cloth under shade or covered. The quickest and simplest way to apply the waxed bandage was as soon as the incision was made, and while the operator was in position at the vine. The only objection to this was that the fingers were apt to get sticky for the knife, but he got over this difficulty by using the ball of his hand for the waxed overlap. Mr. Basey agreed that the quicker the wrapping was done the better for the vine. In the bulk of Renmark vineyards the wrap was never used. Mr. Muspratt stated that 9lbs. of resin, 6 of beeswax, and 1 of fat should be sufficient for 18 yards of calico—enough to do 8 or 10 acres. Last year Mr. Muspratt had noticed in one vineyard two single incisions about half an inch apart. Such a practice seemed likely to be harmful. He desired to know whether the bark between cuts this distance apart would curl out? Mr. Howic said that several growers followed this plan, and Mr. Basey said that the bark did not come off. Mr. Woodham, who had used two single cuts for years with satisfactory results, stated that the bark would come off from between cuts a quarter or an eighth of an inch apart, but not if there was half an inch between them. Mr. Basey remarked that current vines, uncinctured, would sometimes hold their berries till Christmas, and then drop them. Several members referred to the late drying off of currants from cinctured vines last year—a phenomenon observed in currant growing districts right through Australia. Mr. Waters was one who ate. He found that the effect of the cincture was almost instau-He had cinctured vines from which the berries were dropping in the morning and had found the berries set tight by night. Mr. Muspratt had cinctured late, and then had to top "like a windmill" to get the fruit to set. He thought it was not desirable to irrigate either just before or after cincturing. The Sultana.—Mr. Muspratt had little experience in cincturing the sultana, except with the single incision on the main stem. He had never found this affect the growth of the vine, but was satisfied that the double incision on the canes did affect it. He noticed where the cane cincturing was practised that the vines produced a great number of water shoots. Mr. Oliver found that the cinctured canes made their principal growth not below but beyond the cincture, an observation confirmed by Mr. Basey. In reply to a question, Mr. Muspratt stated that he believed in cincturing the sultana, on occasion. If the crop were a medium one, and suffering from winds, then it was a good thing to cincture the vines, but if the crop were a good one the vines were best left alone. The quality of the fruit was not affected by the single incision. Mr. Basey had abandoned the practice of regularly cincturing the sultana on poor land as they found it reduced the of regularly cincturing the sultana on poor land as they found to tended vitality of the vines too much. Instead of getting six canes they were only able to get four canes from cinctured vines, and they came to the conclusion that it was better to get a normal crop from six canes than a forced crop from four. The quality of the fruit was not affected by cincturing, and as an intermittent practice cincturing was of value to the sultana. Mr. Showell's experiments, which had given results entirely in favor of cineturing the sultana, were mentioned, but members were of the opinion that Mr. Showell's tests were somewhat discounted by his method of pruning.

STIRLING'S WELL.

September 25th.—Present: 15 members.

FARM MANAGEMENT. Mr. A. Kubank read a paper on this subject. He said that in their districts good management was essential in order to make a success of farming operations. Careful records of all branches of farm activity should be kept, and any sidelines which did not return a profit should be reduced to the production of household requirements only. Experimental work should be carried out each season, carefully and thoroughly, but deductions should not be made from a single season's operations. Full advantage should be taken of every fall of rain. by harrowing the land after each precipitation; besides keeping the land clear of weeds, this operation would assist in the conservation of moisture. Seeding operations should be completed in June, clean seed only being used, free from smut and foreign weed seeds, and true to type. The characteristics of different varieties of wheat should be studied so that those most suitable to the conditions of the district could be selected; 30lbs. of clean seed was a sufficient quantity to sow to the acre in their district. High grade superphosphate was the most economical to use, and it should be free running in order to ensure even distribution. In the selection of implements attention should be paid to durability, simplicity of construction, lightness of draught, and effectiveness of work. A good water supply for stock and domestic purposes was essential. Suitable buildings should be erected for stables, machinery shed, barn, &c. Stone was the best material for such buildings, and it would eventually prove the cheapest. Substantial fences should be constructed to divide the holding into suitable paddocks; the paddocks should not be too large, otherwise grazing could not be carried out to the best advantage. Clumps of scrub should be left in each paddock to provide shelter for stock. Land should be occasionally sown with oats to discourage the development of "takeall." All implements, machinery, harness, &c., should be kept in good repair to avoid delays occurring at busy times. A discussion took place regarding the amount of wheat to sow per acre, and most members favored 30lbs. Mr. Kubank exhibited some fine samples of Golden Drop wheat, and Algerian oats over 5ft. in height.

WILKAWATT (Average annual rainfall, 16in. to 17in.). October 23rd.—Present: 12 members.

MIXED FARMING.—Mr. J. P. O'Shea contributed a paper on this subject. He said that it was becoming evident to farmers that it was a mistake for them to rely on wheatgrowing alone for returns. If the necessary care and attention could be given them, cows would be found to give good returns, and pig-raising could be very advantageously combined with the keeping of cows. Fowls also should be kept, and they could be profitably fed with poor quality grain which could not be remuneratively marketed. An important maxim which should be observed was that fowls should be regularly replaced by young stock. Sheep would assist very materially in securing clean fallow, great care, however, should be taken not to over-stock with them. Discussion ensued. Some members urged the yarding of all fowls, while others favored allowing them the run of the farm.

BOOKPURNONG EAST, October 30th.—Scrub Farming.—An interesting paper on this topic was contributed by Mr. V. Crase, and many items of importance were discussed. The resignation of the Hon. Secretary (Mr. F. W. McMillan), who has enlisted with the Expeditionary Forces, was accepted with regret, and reference was made to the excellent manner in which he had carried out his duties.

BOWHILL, October 23rd.—Mr. E. Scheer contributed a paper on harvesting, and a good discussion ensued.

GERANIUM, October 27th.—Mr. H. Perrin contributed a paper in which he described the changes which took place in the teeth of a horse as it became older and explained how the age of a horse was thus indicated.

HALIDON, October 27th.—Discussion took place on various seasonable topics. Members agreed that the early crops, i.e., those sown before the end of May, had been consistently better than the later sown crops. In a few instances areas had been affected by frost, but with these exceptions frost had caused little damage in the district. Mr. Westover referred to the occurrence of "take-all" in certain localities, and said it was due to continuous cropping of the land with wheat. He recommended growing two wheat crops successively and following with an oat crop.

MANTUNG, October 28th.—A discussion took place concerning wheat crops and the effects of diseases, frost, and wind.

MENINGIE, November 27th.—The meeting was devoted to the election of officers for the forthcoming year, and to the revision of the membership roll. Discussion on the question of co-operation was adjourned to a future meeting.

BERRI, November 17th.—Mr. E. G. Mitton contributed a paper on "Chemistry," dealing in a simple and interesting manner with many matters connected with everyday life.

MONARTO SOUTH, November 20th.—A discussion took place on the methods of preventing sand drift. Mr. E. Hartmann related his experiences in connection with the sowing of grasses, including Rhodes Grass. To be successful the grass should be sown in April or May.

RAMCO, October 25th.—A discussion took place regarding the wisdom of watering currant vines while in blossom. Members were of opinion that it was well to give them a moderate watering in preference to leaving them until November without water.

SOUTH AND HILLS DISTRICT.

HARTLEY (Average annual rainfall, 15in. to 16in.).

September 22nd.—Present: 15 members.

Conservation of Fodder.—In a paper on this topic, Mr. A. Stein recommended the practice of heading grain crops as a means of conserving fodder. When the wheat crop had reached a mature stage, it should be cut with the binder, the latter being regulated to tie the sheaves somewhat smaller than usual. This would obviate trouble at the time of heading. The sheaves should be stooked immediately after the binder to enable the grain to finish ripening. Oat crops could be treated in the same way, the cutting being commenced when the oats reached the red or purple stage. The sheaves after being threshed could be stored for an unlimited period of time. Mr. A. Stein concluded by urging the purchase of a threshing plant co-operatively by members. A short discussion followed the reading of the paper; diversity of opinion existed regarding the wisdom of the practice, a serious objection being the amount of labor involved.

> INMAN VALLEY (Average annual rainfall, 26in. to 27in.). October 27th.—Present: six members.

POULTRY .- A paper on this subject was contributed by Mr. J. G. Barratt. He said that a dry sheltered place should be selected as a site for a poultry yard. The houses should be built of iron and extensive yards should be laid out and fenced with 6ft. wire netting. Adequate provision should be made to protect the poultry from the attacks of foxes. For egg-laying, he would recommend White or Brown Leghorn fowls, and for table purposes Game or Black or Buff Orpingtons. Chickens should be hatched from May to September, and they would then commence to lay during the period when the price of eggs was high. He preferred the hen to the incubator for hatching, and suggested as a food for young chicks bread crumbs, catmeal, and small grit. Fowls should be fed with grain, and in addition should have an abundance of green feed and grit. Fresh water should also be provided frequently. Houses should be kept in a clean condition, and the floors should occasionally be sprinkled with lime. Discussion followed.

> LONGWOOD (Average annual rainfall, 37in. to 38in.). October 23rd.—Present: six members and six visitors.

The meeting was held at the homestead of Mr. W. Nicholls. Members inspected the property, and were particularly interested in the pigsties, water storage, &c. Seed swedes were noticed to be attacked by cabbage aphis; and Mr. Nicholls mentioned that treatment with kerosine emulsion—one tablespoonful of kerosine and 3galls. water-constituted effective treatment for the pest. Mr. Horner mentioned the value of tar water in this connection. Hero and English Wonder varieties of peas were sown under identical conditions, and the latter were considered to be a fortnight earlier in ripening. Members advised mixing greenstuffs to be fed to milking cows; this being a means of avoiding tainted milk. If this were impracticable, a pinch of powdered saltpetre should be placed in the bottom of the bucket, and the milk directed on to this. A method of removing taints from cream was to separate it, then add to the cream 10 times its bulk of warm water, then put it through the separator again. [The use of saltpetre, as mentioned, is effective, but the Dairy Expert does not recommend the addition of warm water to the cream.—ED.

> MACGILLIVRAY (Average annual rainfall, 19in. to 20in.). October 19th.—Present: seven members and one visitor.

SHEEP.—In a paper on this topic, Mr. H. E. Petras said that as land became better cleared the necessity for keeping sheep was realised by the farmer, as grass and weeds became plentiful, and sheep would control these and turn them into profit. As much of the older cultivated paddocks as possible should be left for pasture and new ground broken up for cropping. Oats and rye should be extensively grown for feeding off, and even after having been fed down several times, would produce a payable grain crop. Rape also, was an excellent fodder for sheep. It should be allowed to grow fairly high before being fed off. The plant known as "yellow thistle" was a good fodder; it did particularly well on sandy land, and appeared to grow all the year round. The oats and rye, after feeding off, would produce an appreciable quantity of hay, which would be a valuable asset on the farm, or if the grain were harvested, and could not be marketed advantageously, it could be utilised for hand feeding the sheep. Where the land was not ring fenced, sheep should be shepherded and brought into an enclosure overnight, otherwise there was a risk of losing some of them. Discussion ensued.

WOODSIDE (Average annual rainfall, 31.95in.).
October 13th.—Present: eight members.

Noxious Weeds.—In a paper under this heading Mr. Rollbusch suggested a revision of the list of proclaimed noxious weeds. The wild cotton, which was already gazetted under the Act, was a plant that required attention. Briars and furze, he thought, should be added to the list, as they completely overran some areas. The seeds were being continuously distributed by wind, water, birds, and beasts. An effective way of destroying briars was to grub them below the surface of the land, and fill in the holes. If the grubbing were done in the summer months the results would be better. The Scotch thistle could with advantage be struck off the list of noxious weeds. The paper was well discussed.

HARTLEY, October 19th.—A gathering of 19 members and 20 visitors was addressed by the Government Poultry Expert (Mr. D. F. Laurie). At the conclusion of his lecture, Mr. Laurie answered a number of questions plied by members of his audience.

IRONBANK, October 25th.—Mr. W. Coats read an extract, which explained the manufacture of jam pulp.

LONGWOOD, November 20th.—The meeting was held at the homestead of Mr. Colbey, and an interesting time was spent inspecting his garden. Discussions took place concerning the administration of the Noxious Weeds Act and a scheme to supply soldiers at the front with fruit.

MOUNT COMPASS, October 26th.—In the presence of a large number of members and visitors, the Government Poultry Expert (Mr. D. F. Laurie) delivered a lecture and answered a number of questions.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.). October 18th.—Present: seven members and two visitors.

EREAKING IN Houses.—The Hon. Secretary (Mr. G. F. Ferguson) contributed a paper on this subject. He said that foals should very early become accustomed to being led and being tied up. The work of breaking in should be undertaken when the colt was from two to two and a half years of age, according to individual development. By putting the young horse in a "loose-box" together with a quiet horse, little trouble should be experienced in putting on a bridle. A surcingle should then be put around the colt's body and the bridle connected with this by means of a rein on either side, care being taken to ensure that the reins were of the same length. The colt should then be turned into a yard where he could walk around. Two hours of this treatment should suffice for the first day, and on the second day the operation should be repeated, and in addition, the colt could be driven around and taught to obey the reins and start or stop on hearing the word of command. Further training could be given by harnessing the young horse to a post, or by harnessing him in the team of a six-horse wagon. He recommended the use of an open bridle, and emphasised the importance of using well-fitting collars. Mr. Jas. Barry suggested the use of a surcingle with a ring on the top, through which the rein could be passed, allowing the horse to freely move its head to either side. Mr. Carthew always made a practice of tying up foals, and believed in the use of winkers when breaking in the colts. Mr. A. Murray did not believe in handling a horse from the time it was branded until the time for breaking in, when the horse should be choked down and a piece of rope passed through its menth with a loop around its head. The horse could then be easily handled. Mr. J. T. Halliday opposed this practice, as injury was often caused

to the animals. A branbag should be put around the necks of young horses when tying them up in order to avoid chafing. Mr. J. Riddoch recommended the handling of horses at the age of two and a half years. He did not favor the use of an open bridle. Messrs. J. Dow, J. Carthew, and J. T. Halliday also spoke.

KYBYBOLITE (Average annual rainfall, 22in.).

September 23rd.—Present: nine members.

WINDMILLS.—In a paper on this subject, Mr. S. Shepherd outlined the progress made in the construction of windmills. "The main points to consider in purchasing a mill for the South-East," he said, "are to ensure that it is all galvanized steel contaking the mill head down, and a good lubricating system. I advise a 30ft. tower over a bore, as its use as a derrick for raising the pump is a consideration, and the extra cost is very little. Then, again, the tanks can be raised sufficiently high to irrigate with sprinklers, as the pressure is regulated by the height of the tank, which equals only 8 2-3lbs. pressure for 20ft. of elevation. I should always use a pump of solid brass construction, and as bores are the most general source of water supply in this locality, I shall deal only with those termed the cylinder. These should be placed as close to the water as possible, or underneath if the supply is weak and the water in the bore deep, so that the pumping limit will not be A good foot valve and strainer are imperative, reached at the lowest water level. and the pipes, both suction and delivery, should have ample dimensions. pump should have nothing less than a 1½ in. pipe, and where the bores are deep either the pump size should be reduced or the pipe increased according to the size of the mill employed. The surface of all exposed water has the pressure of the atmosphere resting upon it equal to 15lbs. per square inch, or thereabouts, as the air is extracted from the suction pipe by the pump there will be no resistance offered to the water to prevent it ascending the pipe about 21ft. for every pound of pressure reduced; 34ft. is the total theoretical limit, and it is found in practice that an excellent suction pump will raise water 28ft. or 30ft., hence the necessity for The suction valve should be as large as can placing the pump close to the water. be possibly fitted in, therefore requiring less lift; consequently there will be less slip, and if the working parts are accurately fitted it will deliver more nearly its full capacity when the mill is running slowly. Use always the best bucket leathers procurable; one properly pressed will give years of service. All joints should be well put together, and the pipes and rods perfectly straight before being screwed together. One often hears it stated that a small pipe places less weight of water on the pump, and must work more easily. This is an error, as the pressure of water at rest is .434lbs. per square inch per foot, regardless of the size of the pipe. If one adds to this the increased friction caused by the increased motion of the water, one will see that a small pipe has not one mechanical advantage. necessary to dwell upon the advantages of the bore and windmill for watering stock. The season just past has justified their use and advantages in this locality, where thousands of head of sheep and cattle must have perished but for the fact that a good supply of fresh water was available.

MILLICENT (Average annual rainfall, 29.25in.).

November 9th.—Present: six members.

A discussion took place regarding the enforcement of the Noxious Weeds Act, and it was decided to urge the local district council to secure the destruction of star thistles on the roads and reserves in the locality. Mr. Mitchell said that it was useless to merely mow the thistles down, as had been done by some landholders. Mr. Williams said that the only effective method was to hoe the plants out by cutting well under the crown. Members did not favor a campaign to get rid of the wild turnip weed, as it was considered to have some value as sheep fodder, particularly during drought periods. Mr. Mitchell referred to the depredations of sparrows and starlings, and thought they would become a serious pest. Mr. Williams said that, although the starlings caused some loss of grain, they were of incalculable value in destroying harmful insects.

NARACOORTE (Average annual rainfall, 22,60in.). October 9th.—Present: 28 members.

Mr. R. E. Chapman read a paper on the productivity of holdings in the district. He thought that they were not producing their maximum returns for the reasons that they were not properly cleared, and the soils needed better drainage, as they were too wet and cold. The district also needed to be thoroughly tested to ascertain what it was capable of producing. The first essential was to clear the land properly. After burning up dry logs, &c., the green timber should be killed, for there was usually too much of it left on the land for it to produce its best. Sheaoak and honeysuckle could be easily cleared by ringing them one year, and burning the next. Of red gums, the low, bushy type were most harmful, and he recommended ringing and lopping them. These trees affected the land for a considerable area around, more particularly in seasons like the recent one. Areas with suitable slopes should be ploughed in narrow lands, to avoid the possibilities of the soil be-The water could then be satisfactorily drained away in coming waterlogged. channels instead of allowing it to run in wide stretches. Flat swamp land was difficult to drain, and was best utilised for growing summer feed. Wheat and oats should be sown in May on all land fallowed or dry ploughed. It was better early, and risk malting than to wait for rain, even if the seed were sown dry. It was better to sow crops should be fed off with stock, as that caused them to grow more thickly, and return a better grain yield. He recommended sowing crops for early green feed on well cultivated land, as uncultivated ground produced much less satisfactory All kinds of vegetables could be grown, some without irrigation. trees also could be grown successfully on well drained land, thoroughly cultivated. A good discussion ensued. Mr. J. M. Wray exhibited some plants of chou moellier, May, using half a pound of seed to the acre. Mr. Loller showed splendid specimens of green feed in the form of rye, barley, wheat, and oats. The land upon which they were grown was manured with Thomas's phosphate two months prior to sowing, when superphosphate was used. Discussion also took place concerning a number of other matters.

WIRREGA (Average annual rainfall, 19in. to 20in.). November 6th.—Present: eight members and one visitor.

HAYSTACKS.—The Chairman (Mr. H. Exton) contributed a paper on this topic. He said that the size and type of the stack to be built should first be decided upon. He did not favor the round-cornered stack, but preferred the gable-ended type. A good foundation of timber, covered with straw, should first be provided. The building of the stack should be commenced in the centre, and continued until the outside was reached. Care should be taken to have the outside layers of sheaves level and the ends of the stack square. The middle portion of the stack should be kept somewhat higher than the edges. The layers should be built alternately with the heads of the sheaves outward and inward, the head of one sheaf being placed on the band of the sheaf in the preceding layer. It was important to build the corners of the stack somewhat higher than the other parts. When commencing the roof of the stack a layer of sheaves should be set some 9in, over the sides of the stack, so that the water from the roof would fall clear of the sides.

KALANGADOO, October 16th.—The Hon. Secretary (Mr. D. W. Tucker) delivered an address dealing with the occurrence of yellow patches among many of the crops in the district. He thought that the main reasons were the excessive moisture which had caused waterlogging of the soil, and the non-aeration of the soil which followed. Thorough cultivation did not appear to have improved the condition of affairs. Some discussion followed, and members generally agreed with the views of Mr. Tucker.

LUCINDALE, October 9th.—Homestead Meeting.—The meeting was held at Mr. Secker's homestead, and the opportunity was taken to make an inspection of the experimental plots being conducted by Mr. Secker.

NARACOORTE, October 27th.—The Government Dairy Expert, Mr. H. P. Suter, attended and delivered an address dealing with dairying matters.

TINTINARA, October 21st.—Eighteen members attended a demonstration on "Wool Classing" given by the Wool Expert, Mr. Henshaw Jackson.

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Conference.

Arrangements are now being made for the Annual Conference of Mid-Northern Branches of the Agricultural Bureau, which is to be held at Gladstone on Wednesday, 16th February next. In addition to lectures by officers of the Department of Agriculture, the agenda will include papers to be contributed by members of Branches constituting the conference district.

Poultry in South Australia.

The Government Statist, in his report on the production statistics for the year 1914-15, states:—"It is estimated that the poultry and egg production of the State for the year was worth £524,347. The returns show that there are 1,338,605 fowls, 44,715 ducks, 15,136 geese, and 40,745 turkeys in the State. In many parts of the State foxes are reported to have been very destructive to poultry during the past year."

Butter, Bacon, and Cheese Factories.

There are 12 bacon and 46 butter and cheese factories in the State, the latter being described as 25 butter, 11 butter and cheese, and 10 cheese factories. These employ 253 hands—245 males and 8 females. They possess machinery estimated to be worth £33,644, the power of the engines (full capacity) being 660h.p. In these factories 6,656,680 (previous year 8,811,155) gallons of milk were used in making 3,258,534 (previous year 4,415,074) lbs. of butter and 1,976,721 (previous year 2,162,779) gallons for making 1,999,401 (previous year 2,214,865) lbs. of cheese. In addition, bacon and hams were cured to the extent of 2,613,713 (previous year 2,520,035) lbs.—Government Statist's Report, 1914-15.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

Forest Administration.

In the annual report upon State Forest Administration in South Australia for the year ended June 30th, 1915, the Conservator of Forests (Mr. Walter Gill, F.L.S., F.R.H.S., J.P.) states that the grand total area of forest reserves in the State was 147,814; acres. The area enclosed for planting and natural regeneration, on June 30th, 1915, was 20,1333 acres. The number of trees planted during the year was 503,760, of which 471,259, or 934 per cent. were alive on June 30th, 1915. Dealing with the injurious effect of the dry season, the Conservator says:-"The effect of the excessively dry season experienced this year has been very trying in elevated hilly country, where the soil is shallow with rocky outcrops near the surface, and even in deeper soils the absence of good, penetrating subsoil rains for now quite three winters has tested the powers of endurance of trees on many sites to It is hardly a matter of wonder, therefore, that growing timber has received a check, not only in plantations, but also in the natural forests. At Bundaleer, in the pine plantations, some trees have gone off here and there, but those which have been removed have served the purpose of a careful thinning, and will supply valuable material, which can readily be utilised for executing orders on hand for cases. At Redhill, the absence of rain was especially marked, both as regards loss of feed, and also evil effect on the trees. Drying winds are trying enough there at any time, but this year were worse than ever, in addition to which the injurious effect of the akaline matter in the soil has been increasingly felt as the trees root deeper. The Kingston sheaoak (Casuarina glauca) has proved the most reliable tree to stand the peculiar conditions in this class of country."

The Effect of Selection and Size of Seed Piece on Yield of Potatoes.

Bulletin No. 155 of the South Dakota State College of Agriculture reports the result of experiments conducted by members of the staff in regard to the effect of selection and size of the seed piece on the yield of potatoes. In a previous bulletin (as is pointed out by the International Institute of Agriculture) it was shown that the yield of potatoes from pieces of large seed potatoes was 28 per cent. higher than that from pieces of small seed potatoes. The present experiments were designed to determine the relative influence of the mere size of tuber, and the strain of tuber in this increased yield obtained by planting pieces of large tubers. Five series were arranged as follows:—(1) Seed pieces of a given size from selected tubers. pieces of this same size from small tubers or culls. (3) Small seed pieces from tubers of a given size. (4) Medium seed pieces from tubers of a given size. (5) Large seed pieces from tubers of a given These series of plots were carried out with two varieties of potatoes, Early Ohio and Carmen No. 3. With regard to the first two series, out of a total of nine pairs of rows, six gave differences in favor of the selected tubers, though the seed pieces were equal in size in all This superiority for the two varieties averaged 5.53 bushels per In the series 3, 4, and 5 the size of the seed pieces was the only variable factor, each piece being reduced to one eye only. In every instance there was a pronounced difference in favor of the large seed pieces, and the increased production varied with the increase in size of the seed pieces. The average results of the two varieties (8 plots) were:--

		Busn per Acre.	. Fer cent.	
Small seed	pieces	 174.73	100	
Medium ''		 271.71	155.5	
Large "	* 4	 298.59	170.9	

In order to determine the effect of strain of tuber on quality of crop, the crops of potatoes obtained in series 1 and 2 were weighed individually, and it was found that of the tubers grown from small seed 64.8 per cent. weighed 2oz. or more, whilst the percentage from large seed was 67.5, thus showing a slight superiority in the quality of the crop from selected tubers.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

(Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.).

"R.A.G.," Caloote, has (a) horse with hard lump on knee from kick; (b) desires to know whether feeding rye to mares at time of service would do harm; and (c) number of mares for two and three year old horses.

Reply—(a) It is necessary to feel the lump to tell whether it is osseous or synovial before offering treatment; (b) rye, like any other change of feed, upsets the digestion of a mare, and so prevents conception or induces abortion; it is the change, not the rye, that does the harm; (c) two-year-old colt, six mares; three-year-old, up to 20 mares with intervals of a few days between.

"R.S.K.," Dawson, has a pony mare with lump on quarter.

Reply—The symptoms are very suggestive of an abscess arising from an injury, and no harm would follow an exploratory incision with a sharp, clean knife at the lower hind part of the swelling, following the line of the muscles; make the hole big enough to put the finger well in, and dress afterwards with spirit of iodine.

"P.H.K.," Clare, asks whether sulphur scattered in hay would be suitable for keeping mice out of haystacks.

Reply—Sulphur scattered on bags is very effective in keeping mice off, so that the same should be applicable to hay, and no harm would follow the use of 2lbs. to the ton scattered on the ground, and in the first 3ft. of the stack as suggested. Sometimes chemical changes will take place and a foul smell may result, but still no harm.

"W.C.E.," Curramulka, asks for a means of clearing fleas from a stable.

Reply—Boiling water on the cracks and crevices where they breed is a cheap and effective preventive, then scatter sulphur or chlorinated lime; as they are continually breeding, a few repetitions are required weekly during their breeding season. Affected harness, clothing, &c., may be dealt with as follows:—On a patch of sandy ground make a ridge round a 6ft. square a few inches high, put the things inside this in the sun, and after an hour or two remove them, the fleas will have left, and be in the patch where they can be burnt by a little straw. Dressing the horse's heels with benzine one part and olive oil five parts every evening will give them great relief, and for human irritation a few moth balls (napthalene) dissolved in methylated spirits, and applied to bites is soothing; can de Cologne can take the place of spirit if so desired. Insect powder (pyrethrum) applied vigorously is also advisable, but more expensive; tobacco dust is cheaper, but not so effective. Tarring cracks also helps.

"H.J.H.," Pinnaroo, reports that a horse affected with worms and sand last year, now grinds teeth, does fairly on green feed, but badly on dry; sluggish at work.

Reply—The results of last year's experiences; there are worm abscesses in the stomach. Try a tablespoon of Fowler's solution of arsenic and a teaspoon of baking soda twice a day in a little bran (wet) for a fortnight or three weeks.

"H.J.G.," Avondale, Cradock, has a four-year-old colt with soft painless swellings which rise and disappear on various parts, loss of spirit and fondness for following a mare.

Reply.—The symptoms are those of filariasis or microscopic worms in the blood; he would probably benefit by taking in feed once a day for three weeks two tablespoons of Fowler's solution of arsenic.

"G.S.," Clare, reported mare, five years, with lump inside hind leg, bleeds, and is irritated by flies.

Reply—From the description the lump is probably a wart, and as suggested, should be cut off close to the skin. A better dressing than salt would be a little powder sheep dip.

"P.P.K.," Colton, reports cows affected with dry bible.

Reply—A cow will often go down a year after her starvation period, being at the latter time quite fat. The disease being a degeneration of the nerve supply of the third stomach, may be acute or lingering as in this case. Prevention depends on mixed feeding, as certain food elements called vitamines may be missing in even excellent feed if of one sort only. Bran, lucerne, &c., will obviate the trouble. Licks consisting of three parts bonemeal and one part saltpetre are useful where bone-eating and wasting occur. An affected

animal generally benefits by receiving three times a day two tablespoons of syrup of phosphate of iron in molasses or gruel.

"A.J.W.," Minlaton, has a draught mare, 10 years, with slight lameness, stiffness, and enlargement of knee.

Reply—The symptoms are those of rheumatic synovitis. Try rubbing the knee daily with mercurial ointment, and let the mare have a powder twice a day consisting of a dram each of sulphur, saltpetre, salicylate of soda, and iodide of potassium; this should be given for aweek. The recipe for an embrocation will be found on page 39, Journal of Agriculture, August 1914, under "Ammonia."

"W.E.H.," Middleton, reports cows lying down, chewing cud, restless when standing, stiff, reach backed, unable to eat hay or long feed, willing to drink, but have difficulty; bowels work fairly well.

Reply—The symptoms are those of digestive trouble due to yacea, or in the absence of that, to a muscular affection called Sarcosporidiosis, either of these are often called dry bible. Give a table-spoon twice daily of this mixture:—Equal parts of carbonate of iron, sulphur, saltpetre, nux vomica, dry yeast. Encourage drinking, and if refused pass greased pipe down throat and pour slowly into paunch a few gallons of milk and water.

"G.M.," Port Lincoln, has a cow which retained cleaning after first calf and does not conceive.

Reply—There is probably vaginal or uterine catarrh, which could only be determined by a qualified veterinary surgeon's examination, and if such is the case she will be more useful to a butcher than a breeder. Try her for a month with 10 drops tineture pulsatilla each morning and 10 drops tineture nux vomica each evening given on the tongue, and before service swab her out with warm water and washing soda at the rate of a handful to a bucket; this should be done an hour or so before service.

"T.S.," Claypans, River Murray, has a yearling filly, bow-legged, and with lumps as big as hen eggs above knees and hocks.

Reply—The symptoms point to rickets or scrofulous arthritis, and the filly is not likely to be completely cured, but would improve if she got upon her tongue twice a day, or diluted and mixed with bran and chaff, a tablespoon of syrup of phosphate of iron. The swellings should be rubbed daily with mercurial ointment. Treatment would probably have to extend over a month.

"A.H.W.," Belalie North, has a colt with swelling between fetlock and hoof near hind; walks on point of toe.

Reply—If there has been no local injury since castration it is more than likely that one of the glands under the loins has remained

enlarged after the previous trouble; if this is so the colt is likely to grow out of it.

"A.S.," Merghiny, West Coast, reports that a mare died after swelling of udder, hard breathing, but no pain. P.M.—Black spots and patches on lungs and liver and other organs.

Reply—The symptoms are those of a form of blood poisoning known as hæmoglobinuria. Should another case occur the animal should be put off work until quite recovered, and should receive daily a tablespoon of the following powder morning and evening in feed:—‡lb. each Epsom salts, saltpetre, sulphate of iron, sulphur, gentian, sulphate of quinine.

"H.A.N.," Meribah, has a mare, eight years, with weakness, inability to retain urine on movement.

Reply—The symptoms point to constitutional weakness and specific trouble in the bladder. Give twice daily in feed for 10 days a tablespoon of the following powder:—4b. each of camphor, gum tragacanth, carbonate of potash, carbonate of iron, gentian and powdered liquorice.

"A.L." Wattle Creek, Kooringa, has a mare, seven years, which experiences loss of condition and weakness when at work or on hay; regains condition at rest on green feed.

Reply—The symptoms point to teeth and digestive trouble, and possibly more serious mischief, such as heart disease. Examine the teeth, as so often suggested in these replies, and if they are diseased they will have to be attended to; if they are all right try a table-spoon of the following powder once a day in food for a fortnight:—‡lb. each sulphate of iron, sulphate of quinine, sulphur, saltpetre, gentian and calumba.

"J.A.H.," Tintinara, has a mare with sore on wither, which is constantly discharging.

Reply—As feared, the sore is probably a fistula in the early stages, and it would be best to open it out, as in the case referred to; but if preferred, as it is recent, the hole might be probed with soft wire and a tape seton run through it and dressed daily with Venice turpentine and irrigated like the other. If not successful in a month or so a further letter would be esteemed.

"B.A.N.," Kapinka, via Tumby Bay, has a blood mare, four years, which cut sinews of hind leg; proud flesh formed, the wound became fly-blown, and smells strong and itches.

Reply—The usual history of such a wound at this time of the year. Never mind the proud flesh; Nature uses it to fill up gaps. The main thing will be to turn out the maggets by washing the wound with a lotion made of as much corrosive sublimate as will lie on a shilling flat, to a whisky bottle of water. Label it poison in big letters; then wipe the wound with a lotion consisting of a similar amount of iodine to half a pint of benzine; this must be done daily, and then dust the wound thickly with a powder consisting of one part chlorinated lime to seven parts boracic acid. When the wound has begun to look healthy apply for a few minutes a day, increasing the time gradually to an hour, 2ft. of rubber gas piping tightly drawn round the leg above the injury, taking care, by means of a cradle, to keep the mare from biting the wound.

"O. J. M.," Penong, West Coast, reports that a gelding, five years, suddenly became stiff in legs after drinking and feeding on grainy chaff.

Reply—This appears to be a mild case of laminitis, following a slight digestive upset. Keep the feet wet and cool, and give morning and evening 10 drops tr. aconite for a week, also in the drinking water give twice a day an ounce of Epsom salts.

"W. R. R.," Koppio, West Coast, reports that a mare was kicked inside hock a month ago, and apparently recovered, but a fortnight ago leg swelled and broke at seat of wound; hock still swollen, in spite of fomentations.

Reply—Apparently periostitis has set in; it will be well to continue one daily fomentation with a little arnica in it, and once a day dress well with methylated spirit, in a pint of which as much perchloride of mercury as will lie on a threepenny bit has been dissolved. A further report will be esteemed.

"O. J. M.," Penong, reports that a horse, 10 years, appears to have strangles, but no nasal discharge; big hard swellings of glands under jaw and below ear, slobbering and uncertain appetite, sighing, roaring, and heaving of a fortnight's duration.

Reply—The symptoms seems to point more to glandular tumors than strangles, and the case does not sound too hopeful. Steam the head well with a teaspoon of eucalyptus oil twice a day; rub blue mercurial ointment into the swellings once a day after fomenting well with hot soapsuds. Place upon the tongue twice daily for a week 5grs. of iodide of arsenic in 20grs. of sugar of milk.

"G. R. W.," Tovington, Wynarka, has a draught gelding, nine years, with hard swelling above hoof head.

Reply—From the description the swelling is most likely a ring bone, for which everybody has a cure; but the only satisfactory way of getting rid of the swelling is to get rid of the horse. The change to hard country was probably the exciting cause.

"L. W. A. P.," Berri, reports the occurrence of swelling and grating sound in hindquarters of a cow.

Reply—There is a fracture of the pelvis, as indicated by the grating sound; if there is any condition about her the most economical course would be to butcher her. If treatment is decided on, the only thing to do is to make her comfortable on the ground—slinging is no good. Should an abscess form, it will have to be opened.

"F. D. L.," Owen, has a three-year-old draught filly falling off n condition, and passing small worms, about ½in., and some about 2in with sucker mouths.

Reply—The small ones are Sclerostoma tetracanthum, the larger Sc. equinum, both common bloodworms.

"Loyalist," Curramulka, has a stallion with discharge and swelling of penis.

Reply—As surmised, there is specific disease, and there is little chance of permanent cure for a stallion required for service, and he would be more valuable as a gelding. At present the most effective treatment would be to purchase a bottle of soloid perchloride of mercury (Burroughs & Wellcome), and after thoroughly cleansing the sheath and penis with soap and water, inject one dissolved in a pint of lukewarm water daily until the organ seems healthy. He is likely to infect mares, and not be a sure foal-getter.

"E. J. H.," Coonalpyn, has a colt, two years, which was castrated three months ago, falling away in condition, losing power of off hingles.

Reply—It is probable there is a glandular enlargement in conrtion with the cord on the off side. Mix with a little molasses and proportion to the tongue once a day for a fortnight, one dram of iodide of potassium.

"C. J. P. D.," Penola, reports a mare with subacute pain, heaviness, stiffness, and tender footedness; at first lying, then persistently standing; somewhat constipated.

Reply—The symptoms seem to point to organic disease of the liver, which even in *post mortem* is not readily recognised, and the later symptoms seem to point to an extension of dropsy to the chest. The first dose of oil was all right, but it is doubtful whether the second was advisable. If not too late, try her three times a day with a dram (flat teaspoon) of sal ammoniac mixed with a little molasses, and smeared on the teeth; keep this up for three or four days, and report further. The outlook is not too hopeful.

"J. F.," Georgetown, has a filly, three years, wheezing, scarcely able to draw breath, blind and silly, constantly walking round and into anything in the way.

Reply—The symptoms are those of pneumonia and meningitis, and the chances of recovery are poor. Mix 2ozs. carbonate of ammonia, loz. sulphate of quinine, ½lb. Stockholm tar, and ½lb. each of glycerine and honey. Smear a flat tablespoon of the mixture on the teeth three times a day. Let her have crushed oats, bran, and lucerne, if possible.

"G. T. G.," Prospect Hill, Meadows, reports that sheep go blind and recover.

Reply—See replies in December Journal of Agriculture. The affection is constitutional, not local; a little boracic acid dusted in does no harm, possibly good; but internal medicine convenient to give in the form of Cooper's tablets is required as well.

BREAKWINDS.

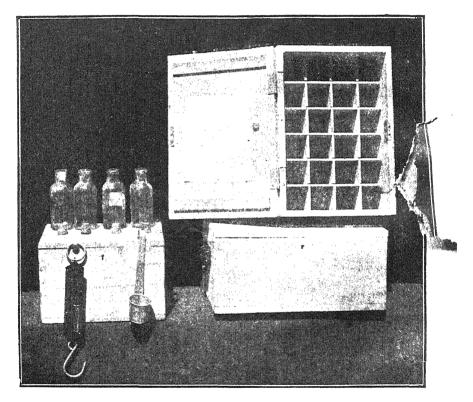
Information has been sought by the Coorabie (West Coast) Branch of the Agricultural Bureau, in regard to breakwinds. The Hon. Secretary mentioned that the soil was light sandy loam, over limestone and limestone rubble. Originally the land was covered with dense mallee and teatree scrub and various bushes. Large areas had been cleared of every tree, and strong west winds in winter had caused the sand to drift; this had proved very destructive to the erops. The average annual rainfall for the district was 13in.

The Director of Agriculture, whilst urging that advice given in a new district was at best tentative, suggested as the tree best suited to the conditions, the olive. "True, its growth is slow," he said; "but it should prove eventually revenue producing if sufficient trees were grown for the purpose. I suggest three rows of trees, not less than 30ft. apart, along the fences, subject to regular tillage, one in early winter and one in spring. Next to the olive, I recommend the carob, also a revenue producing tree, and to be treated on similar lines. The Aleppo pine will also succeed, but will eventually be less profitable. The Stone Pine (Pinus pinea) and the Canary Island pine will probably succeed as well. The evergreen cypress (Cupressus sempervirens) might also be tested, although its adaptability to local conditions is less certain."

TESTING DAIRY STOCK.

DEPARTMENTAL ENCOURAGEMENT

The Dairy Expert (Mr. P. H. Suter) has made frequent reference to the lack of interest in herd testing in this State. Apart from that done by the officers of the Department (referred to in the May and July, 1915, issues of the *Journal*) very little work of a practical nature has been undertaken, and in view of the necessity for dairymen.

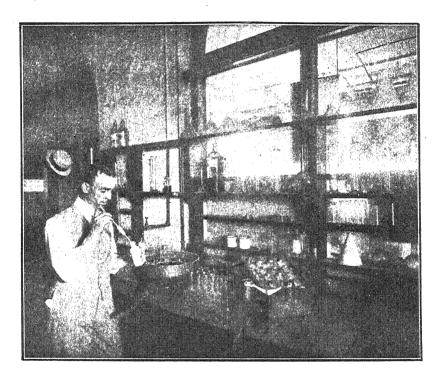


Testing outfit supplied to dairymen and stud breeders.

having an accurate knowledge of the capabilities of the individual cows of their herds, the Director of Agriculture has approved of a proposal submitted by the Dairy Expert, which, it is anticipated, will tend to popularise the use of the scales and Babcock tester.

Although, as pointed out by Mr. Suter, this means of ascertaining the merits of their milch cows is not altogether ignored by dairymen, the number who have adopted the practice makes but a small percentage of the number engaged in the industry; hence the establishment of milk testing associations does not, at the present juncture, appear to be a feasible undertaking.

It has therefore been arranged that certain dairymen in each district shall be invited to place their herds under test. The results will be made known locally, and it is anticipated that neighboring cowkeepers will thus become acquainted with the value of the operation.



Testing samples received from country dairymen.

The Department undertakes to carry out all the work, including receiving samples, testing, keeping full roords for the whole period of lactation, and supplying each owner with a monthly cow record sheet for his information. A charge of 3s., to cover the cost of testing material, cartage, stamps, stationery, etc., will be made for each cow put under the test. So far as is possible, whenever necessary, an officer of the Dairy Branch will visit dairymen, who signify that they desire to commence the testing of their herd, and full instructions will be given.

The owners of herds who desire to have their cows tested under the arrangement will be required to agree to the following conditions:—

- 1. Weigh the milk from each cow morning and evening for two consecutive days each month during the whole period of lactation.
- 2. They keep a sample (proportionate to the supply) from each milking of these two days.
- 3. Forward such samples within two days after taking.
- 4. Pay freight.
- 5. Purchase box and bottles necessary, etc., which will cost approximately for 6 to 10 cows 10s., 11 to 20 cows 12s. 6d.
- 6. Forward with the milk samples, weights of milk given by each eow.

FIRE.

SCRUB AND STUBBLE BURNING—PROVISIONS OF BUSH FIRES ACT, 1913.

Attention has been previously drawn, in the Journal, to the very grave danger of damage from bush fires, and the necessity for every care on the part of landholders to guard against outbreaks of fire. The very fine vegetative growth which has characterised this season, practically throughout the whole of the State, necessitates the exercise of more than usual vigilance in this connection, and attention is therefore drawn to the Bush Fires Act of 1913, which provides:—

STUBBLE.

Stubble must not be burnt between October 16th and January 31st, both dates inclusive, but firebreaks for stubble burning may be lighted during that period, after the following conditions have been observed:—1. The strip is not to be less than 2 chains nor less than ½ a chain wide. 2. Before lighting the fire the land alongside the strip to be burnt is ploughed to a width of 3ft. or cleared of all scrub, stubble, and other inflammable material to a width of 5ft. 3. Twenty-four hours' notice to be given to owners and occupiers of adjoining

land if resident within five miles of the place intended to be burnt.

4. Four men must be present at the fire. 5. No such fire is to be lighted before 9 o'clock in the morning, and it must be extinguished by 9 o'clock at night. The burning of firebreaks or of stubble on Crown lands held under lease, agreement, or licence must, in addition to the foregoing, be preceded by 24 hours' notice to the nearest Crown lands ranger or police constable. Stubble may be burnt between February 1st and October 15th, both inclusive, under conditions 2, 3, and 4, above mentioned. No fires are to be be lighted for stubble burning on a Sunday. Penalty, £2 to £50.

SCRUB.

Scrub burning between October 16th and January 31st, both dates inclusive, is strictly prohibited. Penalty, £5 to £50.

Scrub burning between February 1st and April 30th, both dates inclusive, requires the following precautions:—1. Fifteen feet round the area to be burnt must be ploughed or cleared. 2. Twenty-four hours' notice must be given to adjoining landholders residing within five miles of the place intended to be burnt. 3. Four men must be present during the burning. 4. The fire must not be lighted before 9 o'clock in the morning. The burning of scrub, in addition to the foregoing, on Crown lands held under lease, agreement, or licence must be preceded by 24 hours' notice to the nearest Crown lands ranger or police constable in addition to any other notice. No fires are to be lighted on Sunday for scrub burning. Penalty, £2 to £50.

SMOKING.

It is also advisable to note that smoking is prohibited within 20yds. of any stable, rick, stack, or field of hay, straw, stubble, or other inflammable vegetable, from November 1st to April 30th, except within a town, or with a pipe properly covered. Penalty, £1 to £10.

WHEAT CROP IN AUSTRALIA, 1915-16.

The International Institute of Agriculture estimates that the area sown for wheat in 1915-16 in Australia is roughly 11,634,550 acres, and the production 142,832,289bush., as against last year's production of 24,892,702bush. From this it will be seen that Australia this year is estimated to produce practically five and three-quarter times as much wheat as was harvested last season.

DRY BIBLE IN COWS.

THE IMPORTANCE OF THE FOOD RATION.

A subscriber, writing from the West Coast, asks a number of questions which have probably at some time exercised the minds of most farmers who keep cows. "What are the first signs of dry bible in cows?" he inquires. What is the cause? What is the remedy? What do you consider the best food for milking cows in a district like Flinders? Are mangolds a good food? What is your opinion of molasses meal and copra cake mixed with chaff?"

The Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) in reply, says:—"The early symptoms of 'dry bible' are very indefinite, and not readily recognised until there is a stiffness in walking, as if the ground were uncomfortably hot. The shoulders are humped, and there is irregularity of the digestive organs, temporary loss of cud, and more or less rapid inset of the well-known acute symptoms. The cause is progressive paralysis of the sympathetic nerve supplying the omasum, arising from absence from the food, or inability to make use of, certain food ingredients called vitamines, or nitrogenous constituents, which are quickly changed by climatic conditions, such as prolonged sunshine. It is almost certain that very common muscular parasites called sarcocysts play an important part in inducing the paralysis and that flies take a hand in the distribution of these parasites.

Prevention and remedy consist in a well balanced ration, in which green food or roots take a prominent place. Yeast, as so often prescribed in the *Journal*, is of use in supplying vitamines and restarting rumination, also large quantities of milk and water with molasses. Smearing the cows with fish oil, lightly applied, will keep off the flies. Repeated doses of 10 drops of nux vomica and bryonia alternatively give better results than drastic purgatives.

THE COW'S DIGESTIVE APPARATUS.

The arrangement of the cow's stomach allows for the digestion of long roughage, and it is a mistake to feed too much short chaff, as cudding is difficult on this. Theoretically a 1,000lbs. live weight dairy cow should have—dry matter 24.31lbs. consisting of digestible matter, protein 2.15lbs., carbohydrates 13.27lbs., fat .74lbs., giving a nutritive ratio of 1: 6.9. Lucerne hay, peameal, and haulm are fairly easily transported, and, with bran, provide the necessary proteins and fats, while hay or cocky chaff, or a mixture, provide the fibre and carbohydrates. Without knowing the food actually available it is im-

possible to lay down a standard ration, while a working one can be selected from those given on page 967 of the June, 1915, issue of the *Journal*. Speaking generally for Flinders, one would say hay, bran and ensilage, when an ensilage conscience has been aroused.

MANGOLDS AND MOLASSES MEAL.

Mangolds are one of the best milk producers, and may be fed up to 50lbs a day. In England they are the staple winter feed for the dairy. Their food value increases on storage, on account of evaporation and desiccation; where they can be grown dry bible should not exist. An analysis of fresh mangolds is—Water 88.5, proteins, 1.2, fat 0.1, carbohydrates 8.2, salts 1.0. The greens are good cattle feed for milk also.

Artificial foods, such as molasses meal and copra cake, have a real value in supplying certain constituents of freshness and variety, and cakes as a rule are rich in phosphoric acid and often well adulterated with cocoanut fibre, husks, dirt, etc., so that they should always be bought on guaranteed analysis. Except for convenience in handling molasses meal has no advantage over molasses, and it is a question of balancing costs, for cocky chaff will provide the necessary fibre. A good brand of molasses meal has the following analysis:—Sugars 53.19, digestible fibre 15.83, proteids 2.50 (of these only .40 are available), indigestible fibre 6.27, ash 6.75 (sand, etc.), oil 0.13, moisture 15.33.

Molasses.

Molasses in itself is practically of no value as a food, but, like mustard with beef, forms an excellent condiment. If mustard were sold on analysis it would show an excellent nutritive value, but the beef is still the main dish, and a sect of mustardarians has not yet arisen; so with molasses for cows, three or four pounds daily assist the digestion of other foods and mechanically loosen the bowels, and cost is the deciding factor. So-called copra cake is generally a mixed, very mixed, cake, and sand in it adds to the weight at small cost to the producers and painful aches to the consumer. When bought on analysis from a reputable manufacturer it is a very useful adjunct to the ration, but probably 4lbs. a day is the most that can be economically fed to a milking cow, excess tending towards fat. cost is the decider, and it would probably in most cases be cheaper to lower the cake amount and increase bran and oats. The secret of keeping a cow up in her milk is not to stuff her with any one diet, but to feed variety without sudden marked changes, and much loss may be avoided by substituting a proportion of a food low in cost, such as oats, for maize, or vice versa, while maintaining the balance of the ration, and mixing at home instead of paying the intermediate costs of advertising, distributing, etc."

APPLE-PACKING.

By GEO. QUINN, Horticultural Instructor.

If there is one primary improvement more generally necessary than any other to enable our exporters to gain the confidence of buyers and secure the best value for their apples, it is that the fruit should be selected, graded, and packed in a more uniform manner than has heretofore prevailed.

This is a reform which should "begin at home," and when it becomes an accomplished fact, then the packer will be more fully justified in asking all those who manipulate the produce on its way to the consumer to observe equally conscientious care.

Excellent as may be the methods of packing citrus and other fruits followed in the older countries of Europe, it must be admitted at the outset that it is to the fruit packers of the new world, viz., United States of America and Canada, that we must turn for inspiration respecting how to improve our methods. Hitherto we have been content to grade by the eye, and pack on a somewhat haphazard system, filling up spaces with wood wool and other padding, leading to the complaint that our cases were slack and often not filled with fruit.

Systems.

The American literature on this subject teems with "styles," but after all the whole may, for practical purposes, be referred back to two general types, viz., the straight or square, and the diagonal packs.

In the first, as all packers know, every apple, excepting in the bottom row, rests directly upon another, and if evenly graded to size, each layer and row in every layer contains the same number of fruits.

In the second type no fruit in any layer rests directly upon any single apple in the layer immediately below it, but rests in the space left between three or more fruits which it touches in the tier immediately beneath.

Practically the only modification of the straight pack consists in placing the fruits on their ends or sides or obliquely, for the purpose of filling the space more completely, and thus tightening up the contents of the box.

The diagonal system admits of almost endless modifications to enable apples of different sizes and shapes being packed into a case of fixed dimensions, and yet in each instance to be packed firmly and well.

GRADING.

The foundation of all good packing is even grading to size; but to approach a perfect package, evenness of color in the contents as well as freedom from distortions, disfigurements, and injuries must be rigidly adhered to.

In the past grading to size by sight has been followed, and with the average packer uniformity is not readily obtained by this method. In small establishments hand gauges, such as metal rings or boards with apertures cut to the sizes desired, have been utilized, but in the larger packing establishments the machine grader has become a necessity.

The inventiveness of Australian growers has produced several good apple graders, which, if properly manipulated, do not injure the fruit in the manner formerly attributed to all such appliances.

The grader most generally adopted in the apple-growing districts of Australia is called the Lomas, manufactured by a maker of that name at Huonville. Tasmania, and costing £35 approximately. This machine is capable of separating the fruits into all the differences of size necessary for good packing. In the island State individual growers possess machines, but in South Australia, where the apple orchards are not generally so large, the acquisition of such a machine on co-operative lines is strongly urged upon groups of growers whose orchards are contiguous to each other. The formation of packing centres in each district would enable such an easily transported machine covering the operations in several packing sheds, thus insuring uniformity at least in sizes, whence the other desiderata regarding color and absence of blemishes may be readily attained. In respect to the sizes most suitable for trade purposes, there are few varieties of apples grown in this State which need be graded below 21 in., and certainly none below this size should be exported to Europe or elsewhere. If graded to the four dimensions, viz., 2½ in., 2½ in., 2¾ in., and 3in., all requirements will be met, and the number of cases of apples above 3in. in diameter packed for export should be limited to a few specially selected for window-dressing purposes only.

CASES.

The experiences of older countries indicate beyond dispute that an extremely rigid unyielding case is not desirable for fruit-packing. The wood used should—with the exception of the ends, and division, where such is used—be pliable, but strong and straight in the grain. In the past Australian fruit cases have too frequently not possessed these desirable qualities, whether made from pine or eucalyptus woods. The locally-grown but exotic Remarkable pine (*Pinus insignis*), or the Queensland coniferous timbers possess to a marked degree the toughness and resiliency needed, whilst there is abundant evidence that stringy bark and other eucalypts, if cut and seasoned, may be used to greater advantage than heretofore in the making of fruit cases.

The condition on arrival here of the contents of the American apple cases and the Italian lemon boxes, clearly prove that not in thickness of timber and rigidy of structure is safety for the fruit it holds to be found, but rather in having a package that is resilient enough to yield to pressure, but at the same time passes the movement on through its contents and out the other

side. Suffice it is to mention that American apples packed in Oregon or Washington, United States of America, railed to the seaboard, shipped over a voyage of three or four weeks to Sydney, and transhipped thence in a coasting vessel to Adelaide, open up in a less bruised condition than much of our local fruit packed in the ordinary manner that reaches the seaboard perhaps not 50 miles from the orchard.

This packing case in Figs. 5, 6, and 7 is made of pine wood, the ends being $\frac{3}{4}$ in. and the sides $\frac{2}{6}$ in., and the tops and bottoms $\frac{1}{4}$ in. in thickness, with a cross binding batten at each end $\frac{2}{6}$ in. thick by $\frac{7}{6}$ in. wide, is used on bottom and top alike. Each end board is made in one piece, as is also each side, but the top and bottom each consist of two battens.

The case is the Canadian standard size, the internal measurements of which are 20in long, 11in wide, and 10in deep, and holds 2,200 cubic inches, or slightly under the capacity of an Imperial bushel measure.

Whilst this box is included in the legalised standard cases in South Australia and several other Australian States, the Peacock or Dump case, the internal dimensions of which are 18in. long by 8% in. wide by 14½ in. deep, has been so generally adopted in the Australian apple export trade that to change it would, for the time being at any rate, tend to destroy the distinctive character which a trade package soon acquires in any market.

Several of the most skilled and capable fruit packers in Australia, including Messrs. Ramage, of Western Australia, and Samson, now of Oregon, United States of America, have shown very clearly that the Peacock case can be utilised quite effectively for all necessary forms of packs suggested herein for adoption by our apple exporters.

WRAPPING AND PADDING.

It is taken for granted that each apple is wrapped in tissue paper, the loose edges of which are twisted or folded upon the stalk, chiefly to prevent that attachment from injuring its owner or adjacent fruit which presses upon it.

The American packers line the bottoms, tops, and sides of their cases by using two sheets of a moderately strong white paper, one of which covers one side and most of the bottom, leaving the other to line the opposite side and fold over the top when the lid of the case is being nailed down. This certainly keeps the wrapping paper clean and unbroken, and seems sufficient protection in all respects; but for our fruit, which has to undergo a longer voyage, a thin layer of soft wood wool on the bottom and over the top, either with or without the lining paper, is recommended.

In some States corrugated cardboards, cut into sizes to fit the interior walls of the case have been used. These are decidedly neat, but possess no resiliency once moisture is absorbed, and this invariably occurs, from fruit or atmosphere. Under such circumstances the value of the corrugations becomes practically nullified.

One fact is certair, that the outlay of an extra penny or two in get-up will on the average, more than be repaid by the price receivable for the contents of a case having an enhanced appearance, provided the fruit is otherwise sound and good.

THE STRAIGHT OR SQUARE PACK.

This is the form most generally used here in the past, and although it is possible other factors, such as inferior grading and selection of fruit, as well as

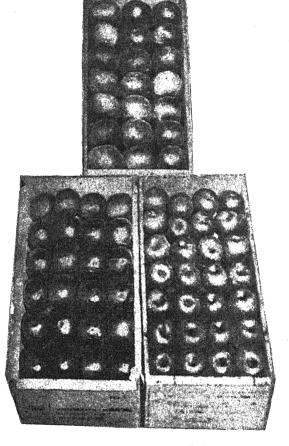


Fig. 1.—Straight or Square Pack.
(Bulletin No. 19.—Department of Agriculture, Canada).

unsuitable cases, may have contributed, the result does not recommend a continuance of this pack for long journeys.

In Fig. 1 three forms of the straight pack are shown, the upper representing large apples packed with their cheeks in contact with each other as well as with the sides of the box. The lower left-hand case has its apples packed on the

cheeks, but the calyx ends are in contact with the sides, whilst the right-hand box has its apples packed on the calyx ends with the cheeks resting against the sides. As most of our cases are stacked on the flat side, of these three packs, the second should offer the greatest protection against bruising, owing to the greater resistance of the ends of an apple as compared with the sides or cheeks. A detailed description of these packs in unnecessary, but to secure the proper filling of the case it may be necessary at times to vary the position of the apples in one or more layers when different grades have to be put up in a similar shaped case of fixed capacity.

DIAGONAL PACKS.

This name is derived from the fact that the rows of apples resting cheek to cheek always make diagonal lines when produced across the layers to which they belong. These packs are known by various numbers, such as the 2-1, 2-2. 3-2, 3-3, &c., which means that the cross rows read thus. These same packs are also further designated by numerals such as 6 x 5, 7 x 6, 8 x 7, 6 x 6, &c., which simply means these are the numbers of the apples in the alternating rows counted lengthways. It will be seen further that the number of apples in a full diagonal line, or row across a tier, is always and same as the sum of the numbers representing two consecutive cross rows. for instance a 2-1 pack takes three fruits in a full diagonal, a 2-2 four, a 3-2 five, &c. Another simple fact to remember is that when the numbers of apples in the rows counted lengthways are even numbers, such as 6 x 6, or 5 x 5, all the tiers in the case will contain an equal number of apples. This also occurs when the rows total differently lengthways, such as 6 - 5, in packs represented by equal figures, such as 2-2 or 3-3, but the alternating tiers will vary one fruit in packs where the numbers differ, such as 2-1 or 3-2.

Messrs. Ramage & Samson have pointed out that for the Peacock case all 2-1 packs contain five tiers or layers to the case, the 2-2 six tiers, and the 3-2 seven tiers; and, strange as it may appear, the size of the apple within ordinary grades will not give a greater or lesser number of layers for any of these packs, as the big apples in one layer imply larger cavities to receive those forming the next, whilst the reverse is the case with the smaller grade fruits. The following schedule, framed by Mr. Samson, may be quoted for ready reference when packing the standard Peacock bushel case:—

2-1 PACKS.												
							$ayers \left\{ \begin{array}{l} 3 = 14 \\ 2 = 13 \end{array} \right\}$					diameter
		5	×	5	4.6	"	15	"	75	"	$3\frac{1}{2}$	4.6
							$\left\{ \begin{array}{l} 3 = 17 \\ 2 = 16 \end{array} \right\}$					66
	44	6	×	6	66	"	18	"	90	"	31/4	"
		7	×	6	4.6	"	$\left\{ \begin{array}{l} 3 = 20 \\ 2 = 19 \end{array} \right\}$	"	98	**	31/8	66
	44	7	×	7	4.6	"	21	"	105	6.5	8	"

2-2 Packs.

2-2 Pack	5	X	4	contains	6 layers	each	18	==	108	fruits	3in.	in	diameter
66	5	×	5	"	"		20	=	120	4.4	2^7_8		44
"	6	×	5	6.6	4.		22	-	132	6 6	$2\frac{3}{4}$		6.6
44	6	×	6	"	"		24	=	144	"	$2\frac{5}{8}$		66
4.	7	×	6	٠٠	4.6		26	==	156	4.4	2_8^5		46
4.6	7	×	7	**	4.4		28	=	168	"	25		66
4.	8	×	7		64		30	=	180	4 6	2_8^3		

3-2 PACKS.

```
3-2 Pack 5 × 5 contains 7 layers each
                                                25
                                                     = 175 fruits 25in. in diameter
                                          4 = 28
   "
           6 \times 5
                                                     = 193
                                          3 = 27
           6 \times 6
                                                30
                                           4 = 33 )
           7 \times 6
                                         3 = 32
                                                    = 228
                                                                    21
           7 \times 7
                                                                    23
                                                35
                                          (4 = 38)
           8 \times 7
   . .
                                                                     2
           8 \times 8
```

In respect to the above growers are strongly urged to restrict their export lines between the grades $2\frac{1}{4}$ in. and $3\frac{1}{4}$ in., and if the fruits be graded $2\frac{1}{4}$ in., $2\frac{1}{2}$ in., $2\frac{3}{4}$ in., and 3in. all practical needs for the purposes of the packing herein described may be met by the commonsense of the packer.

How to Proceed.

If the fruits are not graded beforehand to sizes the above tables will prove of no value, and the packer, if a beginner, will be compelled to take samples of the grade he intends packing from the bulk and make a preliminary trial with a single row of fruits across the end of the case, then from bottom to top, and lastly from end to end, to gauge the capacity of the box for containing apples of that particular size.

The
$$2-1$$
 Pack (Fig. 2).

This is used for large apples 3in. in diameter and over. As previously remarked, three apples make a diagonal row, and there are three longitudinal rows in each of the five layers or tiers.

The first apple is usually placed in the left hand corner of the case next the packer, the second in the right hand corner, whilst the third fruit is pressed firmly into the space between numbers 1 and 2. The fourth apple rests in contact with 1 and 3 as well as against the left hand side of the box. The fifth is placed against the opposite side and holds 2 and 3 in position. Number 6 is then used as a wedge in the gap between 4 and 5, and so on until the layer is completed.

A glance at Fig. 2 shows it to be a 6 x 5 form of this pack, and as there are five layers in all 2-1 packs, the first, third, and fifth layers in this will contain

equal numbers of apples, and the second and fourth one fruit less. In consequence, if (b) represents the fifth or bottom layer, the packing of which we have just described, (a) will represent the fourth, or the one immediately above it.

To pack this second layer the fruit marked Λ is put into the space made by 1, 2, and 3, and will rest upon these fruits and against the end wall of the case, B will fit into the gap made by and rest upon 1, 3, and 4, whilst C will do likewise in respect to 2, 3, and 5. D will then fill the space between and

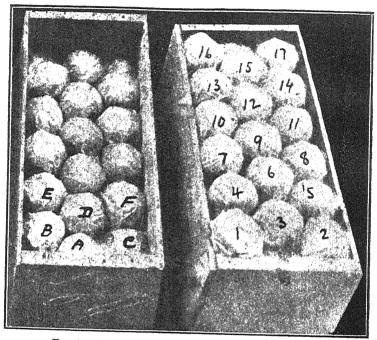


Fig. 2.—(a) Pack 2-1, 6 x 5. (b).
(Bulletin No. 20—Department of Agriculture, Victoria.)

rest upon 3, 4, 5, and 6 in even proportion; E do the same in respect 4, 6, and 7, whilst F will perform a similar office towards the gap and rest made by the fruits marked 5, 6, and 8, and so on until the layer be filled, when it will be seen that the layer will consist of two outer rows of five and a central one of six fruits respectively, and so on working upwards, the third layer will be the same as the bottom one, the fourth identical with the next to bottom, and finally the top layer will be an exact counterpart of the middle and bottom ones.

2 - 2 Pack (Fig. 3).

This pack is used for grades of apples varying from medium to large $(2\frac{1}{2}in.$ to $3\frac{1}{8}in.$ diameter), and there are six tiers to the case. The packer begins by

placing an apple in the left hand bottom corner of the box, and a second midway between the first apple and the right hand corner. The third fruit is usually placed between Nos. 1 and 2, and the fourth between 2 and the right hand side of the box. The fifth holds 4, 3, and 2, and the sixth presses in between 1, 3, and the left hand side of the case. The seventh rests against 6, 3, and 5, while the eighth is pressed down between 5, 4, and the right hand side of the box, and so on until the tier is completed. The second tier is started by placing the first apple in the right hand corner above the space left between 2, 4, and the case walls. The second rests upon 1, 3, 2, and the case end wall. The third will rest ir the space formed by 2, 3, 4, 5, and the

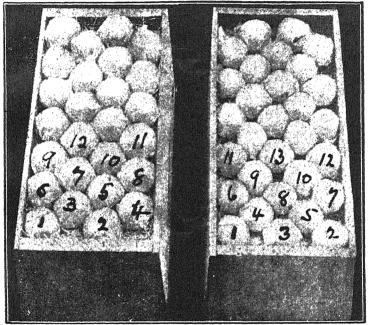


Fig. 3. Pack 2—2, 7 x 6. Fig. 4. Pack 3—2, 6 x 6. (Bulletin No. 20.—Department of Agriculture, Victoria).

fourth in a similar respect to 1, 3, 6, and the left hand side of the box. The spaces are filled in this order throughout the remainder of the tier. The next (third) tier is an exact repetition of the first, and so on.

Some packers advocate beginning the 2-2 packs by placing 1, 2, 3, and 4 as described above, but 5 and 6 are allotted to the spaces occupied by 5 and 8 in Fig. 3. This makes the first diagonal row, which is immediately supported by another, 7, 8, 9, and 10 taking the positions now filled by 6, 7, 10, and 11. Other skilled packers affirm much is to be gained by placing the apples themselves diagonally in their positions with the calyx ends towards the sides of the box.

3-2 Pack (Figs. 4, 5, 6, and B, C, Fig 7).

This pack is used principally for apples ranging from 2in. to 2½ in. in diameter, of which there are seven tiers or layers in a Peacock case. The packer begins by placing an apple in each corner of the end nearest to him, and a third, which also rests against the end of the case, but is half-way between the other two. The fourth is placed in contact with 1 and 3, and the fifth similarly in the gap between 3 and 2. The sixth rests between No. 4 and the left hand

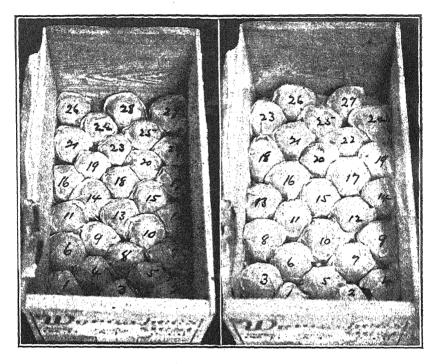


Fig. 5. Fig. 6.

side of the case, the seventh between 5 and the right side wall of the box, whilst 8 is placed between 4 and 5, and so on until the layer be completed.

It will be noted that Fig. 4 is a 6×6 form of this pack, and the tiers all show three apples across at one end and two at the other. Fig. 5, on the other hand, is a 6-5 form, and the alternate layers both begin and finish with a cross row of three fruits.

In Figs. 5 and 6 the first and second layers—counting from the bottom upwards—are respectively displayed with numbers indicating the order in which the apples are packed in their respective layers. These are actual photographs of (C) in Fig. 7, which is a picture taken from a consignment of apples which arrived from Wenatchee, Washington, U.S.A., via Sydney.

In the same figure (B) represents an 8 x 7 form of the 3 — 2 pack. The case seen at (A), Fig. 7, is a 3 — 3 or modification of the "offset" pack.; it is a 7 x 6 form containing three rows of seven and three of six fruits in each of its six layers, making a total of 234 apples of a rather small grade, though it did not seem amiss in highly colored fruit. In this same figure may be noted the brand used by the exporter to advertise his goods, likewise the lids with a binding cleat at each end, and the rather cheap inferior lining paper used in the cases. The wrapping paper was also inferior and brittle, compared with that usually used in Australia for apple-packing.



Fig. 7.—A, 3 - 3, 7×6 ; B, 3 - 2, 8×7 ; C, 3 - 2, 6×5 .

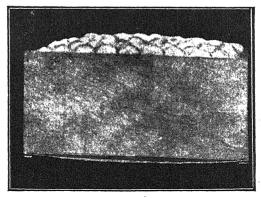


Fig. 8. (Bulletin No. 20—Department of Agriculture, Victoria.)

The Bulge (Figs. 8 and 9).

This is a finish not usually appreciated by Australian packers. It is true our cases may be packed with a sufficient rise over the level of the sides to cause "dumping" the cases first on one end then on the other to be considered a necessary proceeding to the security of the contents when about to nail the lid on, but the true meaning and purpose of the bulge appears to have been either overlooked or deprecated.

This rise, as shown in Fig. 8, is usually obtained by either slightly turning the apples on to their longest diameter, or selecting fruits a trifle above the average grade for filling in the central portion of the box. This is done by a practiced packer almost imperceptibly, and finishes up the contents of the case with a slight arch or dome-shaped top, rising in the middle approximately about an inch and a half above the side boards.

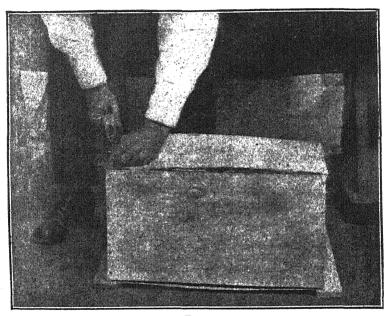


Fig. 9. (Bulletin No. 46—Department of Agriculture, Western Australia.)

Fig. 9 indicates how a case packed to the fulness described may be nailed down without "dumping" or the aid of the mechanical presses used in America, and yet the contents receive no bruising either on top or bottom. This consists of nailing to the floor of the packing shed two 3in. x lin. battens about 16in. apart—for our standard case. The case to be lidded is placed with an end upon each of these battens, and whilst the top is being pressed down by the weight of the workman who nails it on, the bottom battens should be sufficiently pliable to allow the strain thus inposed to bulge it out in keeping with the "swell" left upon the top. As the fruit shrinks the bottom and

top closes back to the normal level and prevents slackness of the contents. If thought desirable the cross cleats may be nailed upon each end as an insurance against the nails pulling through the thin wood, of which the lids and bottoms are composed.

Branding Cases.

The common complaint is that our apple cases are overburdened with brands and arbitrary marks to indicate the grade or quality of their contents. The adoption of grading to size and numerical packing would assist in remedying this and make for general uniformity. The statutory rules under the Federal Commerce Act demands every case shall be branded with four items—(1) the name of the shipper, or a registered brand or device; (2) the kind of fruit; (3) volume, number, or weight of same; and (4) the State of origin. I can conceive nothing more compact to place upon one end of the box in compliance with the above than the following for private individuals:—

J. SMITH

 $193 - 2\frac{1}{2}$

JONATHAN APPLES

SOUTH AUSTRALIA

When our fruitgrowers can agree to pack in groups under a fixed registered device or brand the name of the individual could give place to the name of the district, such as—

BAROSSA

193 - 24"

JONATHAN APPLES

SOUTH AUSTRALIA

and the individual could be distinguished by his initials being placed in one corner of the box. Red apples, fully colored and without any scar, blemish, or malformation, could be branded "Fancy" or "Extra Fancy," but the use of grade numbers or letters is not recommended.

If the co-operation could be extended to all districts a State device, such as a magpie or some other emblematic natural object, could be registered and used for all cases. At any rate the above brands—assuming the fruit packed is selected for its sound and good condition—would make for honesty and the engendering of confidence in our fruit in the mind of the buyer.

I desire in conclusion to acknowledge the assistance obtained from the bulletins on fruit-packing written by the expert officers in the Departments of Agriculture in Victoria, West Australia, and Ottawa, Canada, in the compilation of this article, and to help in preparing illustrations rendered by officers in this branch.

GIVE IT A TRIAL.

The question is frequently asked, "Will a certain crop or fodder grow in my locality?" There is one simple, and perhaps the only reliable, means of determining this, and that is to give it a trial. This does not mean that a large area should be sown or planted, with the consequent risk of a considerable loss in the event of a failure, but that a small plot, just large enough to give the plant a practical test, and enable the grower to watch its behaviour, should be handled. The result of the trial may be failure; if so, the grower does not prove that the plant will not grow in his locality, but simply demonstrates that under the conditions and treatment to which it was subjected by him, it was not a success. If the plot succeeds, he has proved that it will grow under local conditions, and he can then set about to determine the modes of cultivation and handling which are in his case productive of the best results.

THE AMERICAN APPLE CROP.

The monthly crop report of the Bureau of Crop Estimates, U.S.A., Department of Agriculture, states that:—

The condition of the apple crop of the United States on October 1st is estimated to be 63 per cent. of normal, which is nearly 18 per cent. higher than the 10-year average October 1st condition. Such condition figure forecasts a total production of 71,632,000 barrels (of 3bush.), which is 433,000 barrels more than forecast on September 1st. Last year's final estimate of production was 84,400,000 barrels, two years ago 48,470,000 barrels, three years ago 78,407,000, four years ago 71,340,000, five years ago 47,213,000, and six years ago (1909), as reported by the census, 146,122,000bush., equivalent to 48,707,000 barrels.

In September a special schedule of inquiry was sent to country crop reporters of the Bureau of Crop Estimates and to a special list of apple growers, asking for estimates for early varieties and late varieties separately, (1) percentage of normal crop expected this year; (2) yield per tree; (3) percentage of this year's crop which has been or is expected to be marketed; (4) similarly for an average or usual year; (5) quality this year, 100 representing perfect market condition of fruit; (6) similarly for an average or usual year; (7) proportion of crop sold or contracted for by September 15th this year; (8) in a usual year; (9) percentage of this year's crop, which is of early and of late varieties respectively; (10) similarly for an average or usual year; and (11) percentage of crop produced in commercial orchards.

In dividing the apple crop into the two classes, early and late, early varieties included those which mature in summer and early fall and are not usually stored or kept for future consumption; late varieties, those which mature in late fall or winter and are usually available to store or keep for future consumption. Early varieties include Oldenburg, Red Astrachan, Early Harvest, Gravenstein, Williams' Early Red or Favorite, Wealthy, Maiden Blush, Red June, Fameuse (Snow), Fall Pippin, and Yellow Transparent. Late varieties include Baldwin, Ben Davis, Northern Spy, Winesap, Rhode Island Greening, Jonathan, Rome Beauty, York Imperial, Yellow Newtown and Albemarle Pippin, Gano, Limbertwig, Yellow Bellflower, Golden Russet, Tompkins King, Tolman, Grimes Golden, and Stayman Winesap.

The returns from this inquiry indicate that about 31 per cent., or 22,000,000 barrels, of this year's crop consist of early varieties, and 69 per cent., or nearly 50,000,000 barrels, late varieties.

It is estimated that usually about 28 per cent. of the total crop is of early varieties, and 72 per cent. of late varieties.

From this year's crop about 50 per cent. of the early and 59 per cent. of the late varieties will be sold from the farm or the orchard. Estimates for a usual year are 55 per cent. of early varieties and 65 per cent. of late varieties sold or marketed. These figures indicate that from this year's crop about 40,000,000 barrels will be sold, of which 11,000,000 represent early varieties and 29,000,000 late.

The quality of early varieties is estimated at 75 per cent. for this year and 76 for a usual year. The quality of late varieties is estimated at 77 per cent. for this year and 78 for a usual year.

The percentage of late varieties sold or contracted for by September 15th is estimated at 22 per cent. this year and 28 per cent. in a usual year.

About 50 per cent. of the apple crop is estimated to be produced in commercial orchards; that is, orchards from which fruit is regularly sold for marketing in packages.

BEES.

Considering the large areas in South Australia carrying eucalypts and other nectar producing flora, it is surprising that more attention is not given to be keeping. The chief source of honey in the State is the gum. Thousands of acres thickly studded with gums, and eminently suited for bee ranges are to be found along the River Murray, for instance, but apiaries are few and far between. Bees on lucerne country produce a honey of superior quality and flavor, and the flowering lucerne yields a fine supply of nectar. The reclaimed swamps of the Murray, sown to lucerne, offer another field for the development of beekeeping.

Even though the wisdom of one depending solely on this industry as a means of livelihood may be open to question, the value of honey as an article of diet surely warrants the man on the land giving sufficient attention to this sideline to enable him to produce the household requirement.

AUSTRALIAN FRESH FRUITS.

MARKET IN GLASGOW.

The Trade Commissioner for South Australia in London (Mr. C. F. G. McCann), in a recent report, says:—"I visited most of the firms interested in the fruit trade in Glasgow, and the question of the distribution of South Australian fruit from this port was discussed at length. Quite an extensive business is transacted in fruit in Glasgow, this seaport being the main distributing centre for the whole of Scotland. The greater portion of the fruit handled is supplied from America, Canada, and California, and the quantity of Australian fruit disposed of in a season is, perhaps, not by any means in proportion to what it should be; this is due, to a very large extent, to the extreme difficulty in obtaining direct freight connections. The facilities for handling the goods are superior to London; auction stands are greatly in evidence, and most of the firms selling have convenient bulk sample rooms for buyers' inspection.

"I am of opinion that this market should be exploited to a greater degree, and if direct freight is not available, it would be as well to secure space on the fastest boats running to Liverpool, in order to land the fruit in sufficiently good condition to permit of transshipment. The deviation via London ought to be avoided, if at all possible. Apart from the increased cost, the extreme difficulty in obtaining berths for steamers at the docks, and the delay in delivery, due to the lack of transport facilities, will seriously hamper distribution, and depreciate the fruit if the condition is at all unduly mature.

PACKING AND MARKING.

"This season, more than ever, the greatest care should be taken by packers to ensure a distinctive shipping mark, in order to facilitate sorting. I am convinced that a trial of paper labels should be made, if only on a small scale, as I am quite convinced that the time saved at the docks in sorting would more than repay the trouble taken at the other end in pasting these labels on.

"Another point which nearly all salesmen here are emphatically condemning is the endless variety of description, terms indicative of size and quality. It is essential that South Australian growers, either individually or through the medium of their association, should

agree upon a marking, to be uniform throughout the State, and in this connection 1 do not think that they could do better than adopt the A, AA, and AAA grade marks.

"Another feature which most salesmen here commend is the use of corrugated paper even on the sides of the cases. Hardwood sides, if cut green, inevitably warp, and the sharp edge of the battens cuts or bruises practically the whole tier of apples which come in contact with it. Salesmen condemn slack packing, and show no preference for any particular arrangement of the tiers, and I have come to the conclusion that, provided reasonable care and attention is paid by the packers to ensure an attractive top when the case is opened up here for the buyers' inspection, it does not really matter which system of packing is adopted."

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of November, 1915, 2,741bush, of fresh fruits, 19,046bush, of bananas, 7,435 bags of potatoes, 102 bags of onions, 884 packages of vegetables, and 17 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 646bush, of bananas (over ripe) were destroyed. Under the Federal Commerce Act 464 cases of fresh fruits and 400 packages of dried fruits were exported to oversea markets during the same period. These were distributed as follows:—For New Zealand, 464 cases citrusfruits; for London, 400 packages dried fruits. Under the Federal Quarantine Act, 2,573 packages of seeds, plants, and bulbs, etc., were examined and admitted from oversea markets. Of these, 70 bags of linseed were ordered to be cleaned, on account of the presence of proclaimed weed seeds.

THE PIG.

ITS BODY HYGIENE.

The pig is a much misunderstood beast; one needs to know him to appreciate his good qualities. That he should require any more attention than an occasional feed of slops seems to come as a surprise to many farmers. If he should happen to have natural protection from the heat in summer, he thrives—well and good. If this natural protection should not exist, well, the farmer kicks the dead carcass, and murmurs that the pig is an unprofitable proposition, and a dirty animal to have on the farm. "The pig is not, as is usually thought, essentially filthy in its habits," says the Veterinary Lecturer (Mr. F. E. Place). "As a matter of fact, it is the most cleanly of all domesticated animals, but is driven by force of circumstances to adopt habits the reverse of sanitary, and is then put down as filthy.

"The prevalence of so-called ticks, which are really the largest of the louse family, *Haematopinus urius*, does not indicate that pigs are thriving, but that their surroundings are insanitary, and the parasites, rather than tending to the animals' welfare, are the source of direct loss to the feeder.

"The pig, in a wild state, pays a good deal of attention to toilet by scrubbing himself in undergrowth and wallowing in the mire; this may not appeal to the observer as a cleansing method, but it is both cleansing and detergent.

"Physiological changes have been brought about by domestication, and sweat glands that are functionally active in the wild pig have fallen into desuetude in the fat-laden porker. In the wild pig these may be found in similar situations to those in the horse, which act more vigorously than others, behind the ears, at the elbows, and between the thighs; while in the domestic pig they give place to grease glands, and sweating, in its visible form, is practically confined to the snout.

"This causes a dryness and scurfiness of the body, and, through lack of radiation, a certain amount of over-heating of the skin, conditions which a coating of damp mud alleviates, and at the same time destroys itchy parasites like lice. The lack of facility for such mud baths in South Australia is the cause of a good deal of skin irritation and delay in fattening; where it is possible to provide it, one will find it remunerative to do so.

"Failing this natural method, the hose is resorted to by many pigkeepers, and this has both advantages and disadvantages. Among the former is the coolness that follows its use, together with a more active peripheral circulation and the forcible removal of parasites such as lice; it also freshens up the animal and increases the appetite and conduces to refreshing sleep, all steps toward rapid fattening or comfort during pregnancy.

"Chief among the disadvantages are the tendency to chill the surface of the body, often resulting in young pigs in pneumonia and pleurisy, and in older ones in rheumatic stiffness; secondarily, in congestion of the liver and digestive upsets that mean delay in fattening. Also, where sties are either devoid of drainage, or too hygienic, there is the more or less permanent dampness that brings about disease and favors the development of germs like those of tuberculosis; so that where hosing is adopted as a regular habit, it is best to have a small space penned in, with a concrete floor and surface drains, where the pigs may undergo their ablutions and dry off before returning to their sties.

"With such an arrangement an overhead sprinkler is easily rigged, and the bath can be medicated with sheep dip or similar parasiticide with an economy in water and an easy and thoroughly complete bath for the pig. White skinned pigs are very lible to scald after bathing, and should either be greased over after a bath or kept out of the sun until the skin circulation has settled down again."

WHEAT HARVEST SCHEME.

It is anticipated that a statement of the position in relation to the wheat harvest scheme will be published by the Honorable Minister of Agriculture early in the coming month.

WHEAT PRICES.

The f.o.b. price for wheat on December 2nd was 5s. 1d. for December delivery, 5s. for January; the following day prices advanced 1d., and on December 4th there was a still further advance of 1d. From the 7th December onwards 5s. 3½d. was quoted until the 13th, when there was a fall of a ½d. per bushel. December 22nd saw the price firm ½d., and the then rate, 5s. 3½d., ruled until the end of the month, the market being reported firm.

STOCKS.

Stocks held by shipping agents on December 31st, 1915, amounted to 112,326 tons, the quantity of grain shipped to that date being 15,692 tons.

POULTRY NOTES.

[By D. F. LAURIE, Government Poultry Expert and Lecturer.]

BROODERS AND BROODER HOUSES

It is a comparatively easy matter, given good breeding stock, to hatch large numbers of chickens. It is quite another matter to rear these chickens successfully. Some breeders, whose operations extend only to a few hundred chickens, experience great mortality, while where the numbers hatched run into thousands, the mortality often exceeds 50 per cent.

Systems.

There are two main systems of artificially brooding chickens—

1. The heated brooder.

2. The cold brooders.

Heated Brooders.—The designs for these are legion. There are individual brooders, small pipe brooders, mammoth pipe brooders (in which some systems depend upon radiated heat, others upon hot air), mammoth hot air brooders, and so on. The heating is achieved by kerosine lamps, coke ovens, gas, and electricity.

Cold brooders, as the name implies, are not heated, but depend upon the mutual warmth given off by the brooding chickens, controlled by adequate ventilation.

Both systems have their votaries. For many years I reared excellent percentages of chickens and ducklings without artificial heat, and believe no applied heat is necessary where constant attention to the chickens is available.

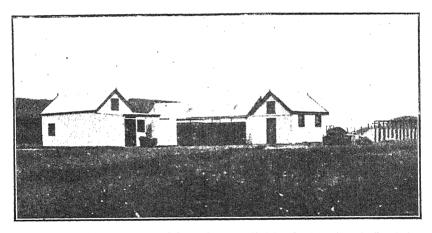
A DEPARTMENTAL BROODER.

Roseworthy, Murray Bridge, and Parafield warm brooder houses were built on the system of unit brooders, heated by kerosine lamps. For many years plans of these brooders have been supplied, also sketches of brooder houses.

Illustration No. 1 shows a convenient arrangement on a fine country poultry plant erected under departmental supervision. The brooder house, 40ft. long, is shown in the centre, between the incubator house, on the right, and the store, on the left. The outside runs are shown.

Additional light is given from the two patent skylights in the roof; these are movable, and permit ventilation of the building.

Illustration No. 2 shows the interior of the brooder house. These houses are from 12ft. to 15ft. wide, and may be any length. There is a passage-way 3ft. wide, with door at each end, so that people can pass through the building. The whole floor is of cement concrete, thus permitting ease in cleaning and perfect sanitation. The brooders are seated on a low platform made of jarrah posts and angle iron bearer. The centre half of the top of each brooder is boarded, and the remainder glass. The brooders communicate with the inside runs, the floors of which are raised. The divisions of the inside runs are 3ft. high, and immediately in front of each brooder is a sliding gate giving access to the runs.

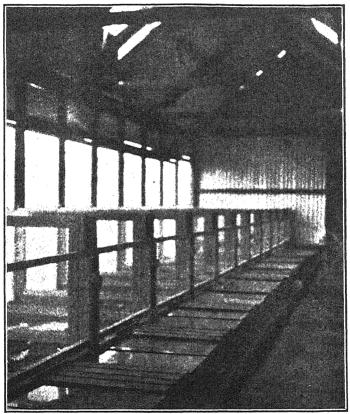


A Country Poultry Plant, erected from plans supplied by the Department. Incubator House on right, Store on left, Brooder House in Centre.

This plant has been successfully operated for some years. Hundreds of brooders have been built to the plans supplied by the department, and for work up to, say, 500 chickens, they are excellent.

The coke oven heated pipe brooder is more costly to instal—it is, however, almost everlasting, and the cost of running is so small that the saving in fuel soon pays for the plant. Such brooders are advisable in houses over 40ft. long. Many depend on heat radiated from overhead pipes; others, again, have the pipes underneath the chickens. The heat passes up a patent flue, and is diffused by a circular hover. A fine 40ft. plant on this system is at Renmark, and is owned by Mr. Buchan. It was built by Mr. D. Lanyon, of Kent Town, who also built the Parafield mammoth incubator.

Cold brooders have again, in recent years, come into considerable prominence. My cold brooders were old boxes. Cocoa boxes the first week, then 14lb. candle boxes; then kerosine cases on the flat; and, finally, a frame with a piece of gunny sack over it in an ordinary poultry house. Frequent attention, and specially during changeable weather, is necessary with this box system; but when properly attended to the death rate is very small, and the chickens grow rapidly.



Brooder House. Interior view shewing row of unit brooders (kerosine heated) and arrangement of inside chicken runs.

THE OLD YEAR-1915.

Poultry breeders will not soon forget this disastrous period. Drought and scarcity of poultry food resulted in the destruction of nearly half the poultry in South Australia. For a time the prospects were dismal, and one felt very near to despair. Good rains and the prospect of a good harvest soon brought a reaction, and early in the

spring there was much inquiry for breeding stock. I understand the breeding season has been fairly satisfactory, and before long the stocks will be normal, as far as numbers are concerned. Judging by a large correspondence, I have hopes that many of my farming friends have replaced the unprofitable mongrels, which the drought destroyed, with mode profitable varieties.

THE NEW YEAR AND ITS PROSPECTS.

In wishing all readers a prosperous New Year, I add a few pertinent comments. Despite the war and its dire consequences, it is the bounden duty of all to encourage production to the utmost limits. Poultry products—eggs and meat—are of great importance as food for the nation. Each year sees an increasing demand for eggs and table poultry, because their great value and economy is gaining recognition. The war in Europe has caused an upheaval in the egg and poultry trade that will not be remedied for many years. Eggs and poultry will be in great demand in England, and at prices which will afford our producers a most profitable outlet.

The average farmer remembers well that a few years ago the price of eggs in the glut season was so small that eggs were hardly worth selling. These low prices greatly discouraged poultry breeding. Unless the unforeseen occurs, these starvation prices will never recur. When the time is ripe, an organised scheme for shipment oversea will be put in hand. Before the drought the local Australian markets were oversupplied, and it will not be long before there is a repetition. The export trade, however, will absorb millions of dozens of eggs and cargoes of frozen poultry. My earnest advice, therefore, is—

- 1. Produce. Breed poultry and make it a recognised branch of agricultural operations—farming and fruitgrowing.
- 2. Adopt modern methods. Breed only the profitable commercial varieties.
- 3. Take pride in the quality of your produce. Collect the eggs daily; pen up all male birds, so that the eggs laid by the hens are infertile. Pack in sound, dry material, and market twice a week. Remember that eggs are easily tainted, and that if packed in damp straw or chaff they will go rotten in a few days, owing to the heat generated and infection by countless bacteria.
- 4. Discard all erroneous ideas—there are many current. You may as well know facts and work on proper lines. Write for information.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held at the Government Farm, Turretfield, on Wednesday, December 1st, there being present Mr. F. Coleman (in the chair), and Messrs. W. J. Colebatch, C. E. Birks, C. J. Tuckwell, J. Miller, A. M. Dawkins, and H. J. Finnis (Acting Secretary). Apologies were received for the absence of Professor Perkins, and Messrs. Laffer, Jeffrey, Williams, and Auld.

EXPERIMENTAL WORK ON IRRIGATION AREAS.

The Acting Secretary tabled the following resolution from the recent conference of the Murray River Branches of the Agricultural Bureau:-"That this conference urges the Advisory Board to impress upon the Government the great importance of establishing experimental and demonstration blocks on the river at the earliest possible moment for the purpose particularly of showing the possibilities of animal products, such as fat lambs, pigs, and dairy Also that a type orchard of a much more comprehensive character than at present exists should be established." Colebatch thought that some of the requirements would be met, to a certain extent, if a capable man were appointed to travel along the river and devote all his time to instructing the settlers what to do and what not to do, and how to do the things which were desirable. After considerable discussion it was decided, at the instance of Mr. Miller, that consideration of the matter should be deferred, and that meanwhile the Director of Irrigation (Mr. S. McIntosh) should be asked to express his opinion on the proposals outlined.

FRUIT FOR AUSTRALIAN SOLDIERS.

A resolution from the Longwood Branch read:—"That this Branch offers through the Advisory Board to collect at least 100 cases of apples and deliver them at a railway station, provided the Government will forward them free of charge to the soldiers at the front." The hope was expressed that other branches would take the subject up. The Board considered that the best plan would be to refer the offer to the Secretary of the Red Cross, and it was decided to adopt this course, and advise the Branch of the action taken.

Noxious Weeds.

Attention was given to a resolution of the Cradock Branch, emphasising the feeding value of Salvation Jane, and protesting against

its being proclaimed noxious in the areas outside of Goyder's line of rainfall; and in addition a resolution from Longwood, "viewing with alarm the rapid spread of this useless weed, and requesting that steps should be taken to have it declared a noxious weed."

It was eventually decided to deal with the matter after the members of the Board had had an opportunity of reperusing the report of the sub-committee appointed in 1912 to deal with the subject of noxious weeds destruction.

NEW MEMBERS.

Approval was given to the appointment of the following new members to the Branches indicated:—Bowhill—Wm. Cottle, S. Cottle, Frank Johns, Harry Johns, W. T. Johns, Keith Mugford, Wm. Spay, R. Bartel; Orroroo—Henry I. Joyce, George Graham; Salt Creek—W. A. Fraser; Glencoe—Albert Murray; Warcowie—J. Marron; Borrika—E. L. Parkyn; Sandalwood—J. Karlson; Hartley—F. Clark; Berri—R. E. Downie; Leighton—W. Edwards; Tintinara—S. Pinchester; Longwood—J. Risley, G. A. S. Risley; Wepowie—S. McMahon; Mount Remarkable—C. F. Packard, W. J. S. Jacka, C. B. Jacka; Morphett Vale—Castles, Furniss; Nantawarra—W. Dixon; Strathalbyn—W. Wallace, B. Eckert, J. Eckert. H. Eckert, C. G. Harvey; Yeelanna—Ern. Behanna; Yaninec—A. Christian; Port Elliot—R. Sweetman; Meningie—F. Stuart.

TURRETFIELD EXPERIMENTAL FARM.

INSPECTION BY THE ADVISORY BOARD

The members of the Advisory Board of Agriculture held their monthly meeting at Turretfield on the 1st December, and availed themselves of the opportunity of inspecting the crops, stock, and general appointments of the farm. The Manager (Mr. G. H. Stevens), who conducted the party over the farm, first directed attention to the irrigation plots. The pumping plant used enables

17 acres of good land to be effectively irrigated when the water in the river is sufficiently free from salt to render its use safe and beneficial. Although only one substantial flooding could be given to the lucerne, at the beginning of last summer, the fodder obtained was a most valuable standby for the stock when all the other fields were bare. Attention was directed to a field of Algerian oats adjoining the lucerne, and it was explained that the land for several years could not be cropped because of the presence of too much saline matter. This season, however, it produced a return of more than four tons of hay to the acre. The heavy winter rains had apparently washed the injurious salts deep into the subsoil, as the crop had not suffered any check from the time of sowing. An area of similar land seeded with a bushel of barley to the acre, and then cross-drilled with a bushel of oats, gave a fine cut for ensilage, and now promises a fair yield of oats.

The initial wheat plot to which attention was directed was an area of 15 acres of Gluyas, alongside which were three plots laid out with the idea of testing the effect of radio-active ore on the growth of wheat. Other crops in this field, all of which are highly promising, are Alma, Rustproof, Queen Fan, Thew (one of the late Mr. Farrer's productions), Bunyip, Marquis, Red Russian, and Cedar.

BREEDING PLOTS.

The hand plots consist of short rows of a large number of different varieties of wheat—the local sorts one one side, and foreign or imported varieties on the other side of a dividing path. Crossbreds were seen in their first, second, third, and fourth generations. Three plots of the Gram plant attracted attention, as did also several rows of American field pease. Continuing on their tour, the party were led between two crops of Le Huguenot and White Tuscan wheats respectively. In places these wheats are well over 6ft. high, and should give an excellent return. Correll's No. 7, Federation Genoa, Bayah, and Triumph reveal every likelihood of yielding well. A 15-acre field of Calcutta Cape oats, fed down in June, has made magnificent growth, and a heavy yield of grain is expected from it.

Members then inspected the horses, cattle, sheep, and pigs on the farm, and in addition the experimental flour mill.

During the day, at the invitation of the proprietors, the Board visited Messrs. Taylor Bros.' Crystal Butter Factory, at Gawler. Members were much impressed with the general appearance of the factory and the up-to-date nature of the plant.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the mon h of and to the end of December 1915, also the average annual rainfall.

Statio .	For Dec., 1915.	To end Dec., 1915.	Av'ge. Annual Rainfall	Station.	For Dec., 1915	To end Dec., 1915.	Av'ge. Annual Rainfall	
FAR NORTH AND	UPPE	e Nor	r11.	LOWER NORTH—continued.				
Oodnadatta		1.78	4.76	Spalding	1.09	1 20.93	1 20 - 25	
Carcoola	0.20	3.52	7.58	Gulnare	0.78	16-67	19.74	
Hergott	0.13	3.24	6.04	BundaleerW.Wks.	1.00	18-38	17.29	
Farina	0.65	4.46	6.70	Yacka	0.80	14.48	1	
Leigh's Creek	0.18	3.87	8.66	Koolunga	0.91	13.85	15.94	
Beltana		5.09	9.22	Snowtown	0.75		15.70	
Blinman	0.12	6.95	12.83	Brinkworth	0.86	16-10	15.48	
Hookina	0.40	10.44	12 05	Blyth	0.74	16.58		
Hawker	0.31	11.31	12.22	Clare	1.17	25.86		
Wilson	0-10	10-19	11.78	Mintaro Central	1.22	30.80		
Gordon	0.55	8.86	10.26	Watervale		1	21.99	
	0.28	18.87	13.78		0.93	28.63		
Quorn	0.55	8.89	9.46	Auburn	0.87	25.54		
Port Augusta				Hoyleton	0.54		1	
Port Augusta W.	0.50	9.09	9.36	Balaklava	0.50			
Bruce	0.18	8.72	10.01	Port Wakefield	0.33		13.13	
Hammond	0.14	8.87	11.46	Terowie	0.76		13.71	
Wilmington	()-41	18-15	18.26	Yarcowie	1.28		1	
Willowie	0.21	10.70	11.90	Hallett	0.52		16.40	
Melrose	0.37	22.94	23.04	Mount Bryan	2.08			
Booleroo Centre	0.23	12.47	15.83	Burra	1.60	21.67	17.82	
Port Germein	0.63	13-19	12.84	Farrell's Flat	0.89	20.74	18.87	
Wirrabara	0.71	22.90	18.91			1	•	
Appila	0.50	12.95	15.08	West of M	URRAY	RANGI	ō.	
Cradock	0.33	8.87	10.86	Manoora	0.71	1 19.66		
Carrieton	0.40	11.93	12.22	Saddleworth	0.62	22.86		
Johnburg	0.27	7.86	10.21	Marrabel	0.70	24.52		
Eurelia	0.10	11.02	13.24	Riverton	0.77	25-49		
Orroroo	2.14	12.34	13.42)			
Black Rock	0.02	9.86	12.25	Tarlee	0.70	23.83		
Petersburg	0.03	11.00	13.07	Stockport	0.81	22.15		
Yongala	0.14	13.79	13.94	Hamley Bridge	0.62	19-41		
	•	'		Kapunda	0.67	23.11		
· Nort	H-EAST			Freeling	0.41	18.79		
Ucolta		8.23		Greenock	0.63	23.79		
Nackara	0.07	8.74		Truro	0.65			
Yunta	0.07	3.99	8.22	Stockwell	0.73			
Wankaringa		4.78	7.94	Nuriootpa	0.59	22.09		
Mannahill	0.25	4.46	8-46	Angaston	0.53	26.89	22.27	
Cockburn	0.08	4.44	1	Tanunda	0.30	23.20	22.28	
Broken Hill, NSW	0.99		9.63	Lyndoch	0.18	24-99	23.01	
•	1		1		**	•		
Lower				ADELAII				
Port Pirie	0.55	7		Maliala	0.29			
Port Broughton .	0.64	14-11	14.33	Roseworthy	0.15	20.79	17.3	
Bute	0.61	15.65	15.42	Gawler	0.34	19.92	19.21	
Laura	0.48	16-80	18.22	Two Wells	0.11	12.83	16.36	
Caltowie	1.11	14-69	17.27	Virginia	0-11	15-45	17 58	
Jamestown	0.87	18.52	17.46	Smithfield	0.05	15.98	17-30	
Gladstone	0.55	14.77	16.00	Salisbury	0.02	16.81	18.57	
Crystal Brook	0.75			North Adelaide	0.04			
Georgetown	0.74		18-32	Adelaide	0.06	19-38		
Narridy	0.80	14.40	16.79	Brighton	0.07	22.03	19.93	
Redhill	0.84	14-68		Glenelg		19.06	18-35	
	1	,	1		1	1	1	

RAINFALI	continued.
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RAINFALL—continued.							
Station.	For Dec., 1915.	To end Dec., 1915	Av'ge. Annual Raintall	Station	For Dec., 1915.		Av'ge Annual Rainfall
ADELAIDE PL	WEST OF SPENCER'S GULF—continued.						
Magill	0.03	25.56	25.69				
Glen Osmond	0.04	27.77	25.26	Streaky Bay Port Elliston	0.14	13.60	15·31 16·49
Mitcham	0.02	26.56	23.47	Port Lincoln	10.2.5	19.70	19.88
Belair	0.07	19.20		Tumby	0.16	13.15	15.00
	0 0.	21		Carrow	0.39	13-66	10
Mount Lo	FTY RA	NGES.		Cowell	0.39	12.95	11 76
Teatree Gully	0.11	27.08	28.19	Point Lowly	0.62		12.21
Stirling West	0.14	55:13	46.70		1	1 "	
Uraidla	0.10	55.73	44.35				
Clarendon	0.05	31.67	33.67	Yorke's	PENIN	SULA.	
Morphett Vale	0.01	21.66	23.32	Wallaroo	0.53	13:15	14.05
Noarlunga		20.95	20.28	Kadina	0.64	15.74	15.88
Willunga	0.07	19.60	25.98	Moonta	0.24	14.48	15.22
Aldinga	0.05	17.96	20.34	Green's Plains	0.67	16.74	
Normanville		19.33	20.65	Maitland		21.54	
Yankalilla	0.05	22.25	22.78	Ardrossan	0.03	13.61	13.89
Cape Jervis		11.21	16.34	Port Victoria	0.03	15.42	15.20
Mount Pleasant .	0.10	30.11	26.87	Curramulka		18.96	
Blumberg	0.14	32.42	29.38	Minlaton		20.46	17-41
Gumeracha Lobethal	0·23 0·09	35.05 40.14	33·30 35·38	Stansbury	0.00	17.67	17-06
Woodside	0.15	39.53	31.87	Warooka	0.02	17.31	17-71
Hahndorf	0.13	34.40	35.45	Yorketown	0.02	14.90	1
Nairne	0.05	30.20	28.83	Edithburgh	0.02	17.26	10.40
Mount Barker	0.07	35.98	30.93				
Echunga	0.03	35.73	32.83	South AND	o Sour	n-East	
Macclesfield	0.06	32.50	30.72	Cape Borda	10.01	125.08	25.09
Meadows	0.10	43.38	35.52	Kingscote	0.05	18.35	18.95
Strathalbyn	0.01	18.34	19.28	Penneshaw	0.03		21.34
				Cape Willoughby.	0.04	21.00	19.69
MURRAY FLA	TS AND	VALLE	Y.	Victor Harbor	0.09		
Wellington	0.05	12.89	15.01	Port Elliot	0.10	1	
Milang	0.03	10.80	16.08	Goolwa	0.10		
Langhorne's Brdg	0.04	10.19	15.27	Pinnaroo	0.49		
Tailem Bend	0.05	11.59	74.00	Parilla Lameroo	0.42		
Murray Bridge	0.15	9.79	14.32	Parrakie	0.53		
Callington Mannum	0.09	13.69 8.69	11.67	Geranium	0.12		
Palmer	0.03	14.89	15.60	Peake	0.07		
Sedan	0.25	12.44	11.92	Cooke's Plains	0.04	- 17	
Blanchetown	0.30	6.42	10.71	Meningie		13.05	
Eudunda	0.55	19.90	17.33	Coonalpyn	0.03	15.54	17.49
Sutherlands	0.31	11.02	10.60	Tintinarra	0.05		
Morgan	0.13	7.19	9.29	Keith		14.74	
Overland Corner .	0.34	7.13	11.42	Bordertown	. 0.04		1
Renmark	0.11	8.25	10.93	Wolseley	0.08		
Loxton	0.18	9.59		Frances		19·03 23·88	
				Naracoorte Penola	0.01		4
* . West of Si	ENCER'	s Gulf		Lucindale	-	23.84	
Eucla	0.18	7.68	10.13	Kingston	0.02		
White Well	0.10	6.06	9.67	Robe	0.03		
Fowler's Bay	0.13	12.64	12.11	Beachport		27:06	27.51
Penong	0.31	12.88	11.93	Millicent		33.15	
Murat Bay	0.62	9.29		Mount Gambier .	0.04		
Smoky Bay	0.35	10.11		C. Nrthumberland	0.04	27.64	26.63
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THE AGRICULTURAL BUREAU.

CONFERENCE OF MURRAY RIVER BRANCHES.

(Continued from page 497).

DRAINAGE OF VINEYARDS AND ORCHARDS.

The following paper was contributed by Mr. F. Cole, of the Renmark Branch:—

It has been justly said that irrigation and drainage go hand in hand; without drainage, irrigation is a failure. If the soil is without natural drainage, artificial drainage must be resorted to.

The difficulty in Renmark has been the absence of reliable data as a guide for carrying out successfully this important and expensive work.

Renmark was the pioneer in South Australia of irrigation coupled with fruit-growing, and it falls to Renmark to be the pioneer in the matter of drainage. At present the drainage problem has only manifested itself in the older settlements of Renmark and Mildura, but the later settlements along the River Murray started by the South Australian Government will meet it as surely as they need the water for plant growth, and the sooner intending settlers take this matter into consideration when estimating the cost of planting a block of trees or vines, the less likelihood there will be of embarrassment in the future. Land that is waterlogged is rendered sour by having all the air driven out of it and replaced by water; this excess of water kills the bacteria which carry on the work of nitrification in the soil. The roots are stifled, and die back as the watertable rises, thus limiting the scope for feeding, until the plant is finally starved. Drainage takes away this excess of water, aerates and sweetens the soil, and increases the feeding capacity of the roots.

Waterlogged land usually occurs in sandy slopes, with marly limestone subsoil, underlaid by blue clay. The clay does not always run parallel with the surface slope, being very often undulating, thus forming pockets for the accumulation of water. This class of country often deceives the inexperienced, as seeing such a slope one would be forgiven for supposing the drainage to be good—herein lies the danger. Irrigation, when practised on such land, usually saturates the top nearest the channel, goes down to the subsoil, is arrested there by hard pan or blue clay, shoots out about half-way down the slope, and the trouble starts. In these cases the injurious salts are brought to the surface and deposited there, the trees or vines then start to go off, and, if left, will soon die out.

Where the salt has come to the surface on these sandy slopes, no amount of drainage will be effective, until means have been found to flood the land, in order to dissolve the salt, and carry it away through the drainage system. To do this the land will have to be terraced on the contour principle. The way to prepare the land is, first to take a level 1 chain from the top of the patch; start in the highest corner, take a level. Say it reads 4ft.; take the next level 1 chain away, keeping around the contour until it reads 4ft. 1in. Keep on taking a level at every chain, falling lin. in every chain, until one gets to the end, when the last two levels should read level; leave a peg at each Now go back and start as before, but coming down the hill 6in. When the whole of the land is contoured, run a plough around each row of pegs, then start buckscraping the banks, terracing the land. One inch in a chain just gives enough fall to flood sandy land quickly, the idea being to dissolve the surface salt, and not put too much water in the land.

It will be found cheaper and better to drain the land prior to planting. First set about to provide for the disposal of the drainage water. This is usually a very troublesome and costly business. The promoters of irrigation settlements should, in my opinion, provide a proper system of mains with which the settlers could connect up their individual drainage systems, thus providing an effective means of disposing of the water, and saving the settlers much trouble and money, which would otherwise have to be spent in providing themselves with their own means of disposal. The usual methods of disposing of drainage water are wells or dams, according to the locality. The dam method is the simplest, if the conditions are favorable; the water might be used for stock purposes, etc. If this method is not practicable, then sink a well into the drift sand. The drift varies from 12ft. to 40ft. or 50ft., and in some places it has not been struck at all. Pumping then has to be resorted to, in which case it is advisable to grow something with the water, such as a patch of vegetables for the house, or lucerne for horsefeed. It is possible to cover the cost of pumping by the returns from the lucerne, etc.

In digging the well, the dimensions of which should be 4ft. 6in. by 2ft., with stays down the centre forming a ladder, care should be taken to timber it from the start, or trouble will be met when striking the watertable. A catch pit should be dug alongside to receive the water from the drain pipes, this catch pit then being connected up to the well. The reason for this is to catch the silt that comes out

of the drains, which can easily be cleaned out, thus avoiding the danger of sitting up the drift in the main well. The cost of sinking and timbering a well 25ft. deep, with no complication (such as are met at times) is £16. In sinking in waterlogged land, one never knows what difficulties one is going to meet. For instance, sometimes one has to take out three buckets of water to one of soil, so this price is based on conditions being normal. With regard to laying lipes, always make a plan of the drain system for future reference, with the measurements of all the branch drains, showing the junctions, talso the length of the subsidiary drains, so that at any time they can be located if they should become clogged. Junction and T pieces can be obtained from the pipe manufacturers. The distance between the subsidiary drains should be about a chain, if they are put 4ft. 6in. d eep in sandy soil; in soil of a stiff nature, they should be closer, and possibly not so deep. At the outset one should start to take the levels. In the absence of a dumpy level, the following method is use ful Measure the line of drains to be put down, then place a T piece of wood at the lower end, on top of this place an ordinary builder's level arranged with two peep sights, one at either end, and see that it reacls level. Then place a staff at the upper end of the line, with a ma,n in charge; now take a sight through the two peep sights on to the staff, and get the man at the other end to mark the exact spot of the sight line. Measure from this spot to the ground, then measure from the line of the two sights on the level to the ground line. A deduction of the upper measurement from the lower will give the fall in inches from the top to the bottom of the slope. Now reduce this, in proportion to the same fall in 5ft. For example, suppose the length of drain to be 200ft, and the fall 20in.; reduce this in proportion to a 5ft. line, the fall will be 1/2 in. Now take two pieces of timber, about 2in. x 14in. and 5ft. in length; tack a piece of leather on the ends, forming a hinge. Expand the other end lin., and make it fast by tacking a piece of wood on the side. This makes a set for placing on the top of five drain pipes in the trench. The level placed on this set should read level. One will by this means have the slope of the drain running parallel with the top slope. It is very important that this work should be done carefully, as if the drains are laid unevenly in the trench, and the fall is not gradual and without any undulation, all the work will be thrown away, and silting up of the pipes will result. Always start to lay the pipes from the well upwards. The depth of the pipes should not be less than 4ft. 6in. I have found a drain of 7ft. much more effective than the 4ft. 6in. drain. A guide to the depth of the drain is the place where the watertable is found; the drain should be placed about a foot below this level. Never open

up all the trenches and then lay the pipes. If this is done considerable trouble will be met from the falling in of the sides of the trench, destroying the firm bottom, which is essential for a properly laid drain. Open up a chain, gradually getting down to the required depth. In throwing out the earth when opening up the drain, place the top soil on one side of the trench, whence it can be returned to its proper place. The man laying the pipes should follow closely behind the man digging the trench, and the last spit to be taken out should be left for the man who is laying the pipes. When this spit is taken out, the bed for the pipes should be made with a proper drainage tool, which takes out a half-round piece of soil, forming a snug bed wherein the pipe can rest. Three pipes should be laid, and have placed over the joints a piece of tarred paper 6in, by 2in. This paper can be purchased in rolls; it is the same as is used by builders for placing under corrugated iron in ceilings. On the top of the paper place a handful of earth, to prevent it shifting when being covered in. The earth taken out from the next spit for the following three pipes should be placed on the pipes just laid, instead of being thrown out of the trench. Continue throughout on this method, levelling the pipes as the work proceeds, and letting the water which accumulates in the trench run through the newly-laid pipes, carrying it off to the well.

Do not use perforated pipes in sandy soil; there is sufficient room between the joints, placed together as closely as possible, for the water to find its way in. The paper placed over the joints keeps the sand from getting in until the loose soil is settled about the pipes. When finishing off the drains, they should be brought to the surface with a piece of downpipe placed inside the drain pipe. This is useful to aerate the drains, also to flush them out when necessary, and to locate a clogged drain should one occur. If it is found necessary to end off a drain without bringing it up to the surface, half a brick placed over the end is effective.

The cost of digging drains 4ft. 6in, in sandy soils with limestone subsoil, and laying pipes, varies according to the state of the water-logged land, and the quantity of water met with, from 17s. to 22s. per chain. Three-inch pipes cost £5 per 1,000 at Mildura; freight and cartage run into another £5 per 1,000, totalling £10 per 1,000 on the land, which will be enough to do 15 chains of drain, at a cost of 13s. a chain.

The plan on which the drains are laid will depend on the fall of the land. Where it is workable I prefer the herringbone principle, no two side drains coming into the main in the same place, but alternating up the main drain.

DISCUSSION.

A great deal of interest was evinced in this subject. Mr. H. S. Tablor stated that Mildura experience had demonstrated that they get rid of the salt as well as the water by means of drainage. Land on which sultanas and currants were dying out at Mildura had recently been quite renovated by this means. Where the land was anything like flat, natural drainage was all that was necessary, provided they could get a good getaway for the water. Not less than 50 per cent. of the area under cultivation at Mildura was drained; drainage was now beginning to be regarded as one of the natural cultural operations for land under irrigation. Citrus orchards there were looking better now than they were 10 years ago, and this was largely attributable to the system of drainage.

Mr. McIntosh said the Mildura people were on right lines when they realised that they were sooner or later up against the drainage problem. At Kingston there was no sign of seepage; this was due to the splendid system of natural drainage, and to the fact that before any of the land there was watered the channels were concreted. He had always contended that they should make the ditches properly watertight before the settlers went on to the land. Otherwise during the first three or four years there was a considerable quantity of water lost, and this was only ruining the land. The adoption of the sprinkler system would in some instances be effective in getting rid of the salt on the hillsides.

Mr. B. Williams (Waikerie) said that in digging channels for drains, after he had got down to a depth of about 2ft., he found that the sides fell in.

Mr. Cole mentioned that he had experienced the same trouble, and had overcome it by propping the sides with boards.

Mr. McIntosh said a casing should be fitted to the drain; this could be lifted with a block and tackle when required.

Mr. Quinn expressed the opinion that the trouble in Mildura and Renmark was due to the use of earthen channels. He felt convinced that if the irrigation settlements were going to flourish, the question of drainage would have to be dealt with in a much broader sense than the mere matter of sinking potholes and draining into them. The questions of draining away surplus water and getting away salt, might, to a very large extent, be achieved in one operation. Under-drainage might have no effect in getting away the salt which was above the ground. Unless they had the pressure of a comparatively big body of water passing through the salt into the drainage pipes, they were not going to get rid of much of the salt. Without terracing and flooding he did not think there was much chance of

getting rid of the salt. The primary question was one of getting a pure supply of water. In regard to Renmark, he was of the opinion that they had better turn their reservoir into a drainage ditch, and secure their water from a purer source.

NEXT CONFERENCE.

It was decided that the next Conference of the Murray River Branches should be held at Murray Bridge in May.

Time was then devoted to "Free Parliament," and a number of subjects were discussed, and questions answered by the visiting experts.

POULTRY

An address was then delivered by the Poultry Expert (Mr. D. F. Laurie), who, after referring to the suitability of the district for egg and poultry production, and the excellent prospects of the industry from the point of view of markets, advised his listeners, if they desired to keep fowls for egg production, to secure the laying strains of White Leghorns. These produced more eggs than other breeds, but the chickens were not good table birds, although the cockerels made good spatch cocks. For eggs and meat they had the choice of Plymouth Rocks, Orpingtons, Wyandottes, and Rhode Island Reds. Good laying strains of these birds and their varieties were to be procured. While they laid fewer eggs in a year than White Leghorns, they were at times good winter layers. Their great value, however, was as table poultry, when young. The farmer required good utility strains—not exhibition types—but only specially bred utility birds typical of the breed.

The question of housing was dealt with fully. The permanent fixture, built of galvanized iron, was recommended as the best, and it was stated that plans might be had on application to the Department. Portable houses were indicated for occasional use in fruit plantations at seasons when poultry could not damage the fruit, but might do good in eradicating grubs and insect pests. For breeding houses and yards the departmental standard house, built as a unit, had been universally adopted. It was 9ft. long, 6ft. high in front, and 5ft. at the back, and was fitted with three rows of perches. It either accommodated a breeding pen, or might be used as a layers' house to hold 20 pullets.

For large flocks large scratching shed houses provided the best accommodation at the least cost per bird. For cold and wet weather egg production they were unequalled, and were economical with labor in watering, feeding, and attention generally. The unit was 20ft. by 17ft. wide, 8ft. high in front, 6ft. at back, and it might be

built in any length. After the chickens left the hen or the brooder house they could be accommodated in yards and houses built on the same principle as the breeding houses, but smaller. Good housing was of the utmost importance, and should include perch and most accommodation, shelter and freedom from draughts, yet provide ample ventilation.

FEEDING.

For egg production, the best results were obtained from the following rations:-1. Morning, wet mash, per bird average 2ozs.; midday, greenfeed, average 2ozs.: evening, grain, average 2ozs. 2. Dry mash fed in hoppers available at all times; green food morning and noon; grain evening. 3. Grain only-no mash; animal food twice a week; green food daily ad lib. Clean water in a clean vessel should always be available. That should be well shaded and kept in a draught in hot weather. An excellent water vessel could be made from a kerosine tin, cutting out about 6in. from the bottom, at the back and front a hole 7in. or 8in. square, and turning the sharp edges downward and outward. That water vessel could be easily cleansed and sterilised, and as a current of air passed through the two holes, the water was kept cool. All tins, whether kerosine or petrol, should be first cleansed with boiling water and washing soda. Petrol was poisonous to fowls. Water vessels might be sterilised with strong solution of either bluestone (copper sulphate) or permanganate of potassium (so-called Condy's crystals).

A hopper of shell-grit (Murray mussel shell, crushed bone, and sharp grit) should be kept available to the fowls. The local grit in the cliffs was excellent. To this should be added a proportion of granulated charcoal, which was an aid to digestion and absorbed acids, etc.

Wet Mash.—For wet mash, one part bran, two parts pollard, and an equal bulk of finely chaffed green food should be used. The bran should be scalded with hot water, hot separated milk, meat meal, or rabbit soup, covered with a bag, and allowed to soften and swell for from 15 to 20 minutes. The pollard and green food should then be rubbed in to produce a crumbly mixture. This should be fed in clean shallow pans and not thrown on to the ground. An average ration was 20z, per bird. Only as much as the pen of birds would clean up in ten minutes should be given. In place of pollard one might use the following:—Ground wheat 2 parts, bran 2 parts; ground barley 2 parts, bran 1 part; ground oats 1 part, bran $1\frac{1}{2}$ parts, adding $\frac{1}{2}$ part ground pease.

Dry Mash.—Dry mash might be made as follows:—1. Bran 1 part, pollard 2 parts, meat meal 5 per cent. 2. Bran 1 part, barley meal

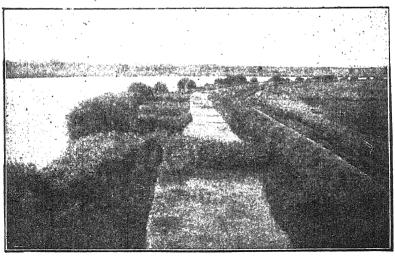
2 parts, meat meal 5 per cent., pea meal ½ part (¼ bulk of barley meal). 3. Bran 2 parts, finely ground wheat, oats, and barley 1 part each, pea meal ½ part, meat meal 5 per cent. This could be fed in small wooden hoppers, fed by gravitation, made from kerosine tins, with a sloping division in the centre and a small trough fixed in front. About 1in. of the tin at the bottom should be cut, this communicating with the trough. Fine wires should be run lengthwise to prevent fowls scratching out the dry mash and so causing waste.

Grain.—Wheat, oats, peas, and in cool weather occasionally barley and maize could be used. All grain should be fed in scratching litter (grass, straw, leaves, etc.). The exercise promoted digestion and health and afforded occupation for the birds. In sandy localities grain might be raked into the soil for this purpose.

The lecturer then dealt with the treatment of various diseases, and answered a number of questions dealing generally with the poultry industry.

VOTES OF THANKS.

The Conference closed with votes of thanks to the visiting experts, the chairman, and the press, after which the National Anthem was sung.



River Murray Reclamation Works.

AGRICULTURAL BUREAU REPORTS.

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altowie anowie Belt	*	15		Kingston-on Murray.	*		-
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herry Gardens	591-600	18	15	Kybybolite	601	13	17
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lare	‡	14	_	Laura	580		_
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oiton	*	22		Lucindale	*	20	
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Redhill	*	18	15	11		1	į

^{*}No report received during the month of December. + Formal report only received.

‡ Held over until next month.



ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
January 12th and February 9th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.).

November 16th.—Present: six members and three visitors.

Spare Time on the Farm.—In a short paper under this title Mr. G. Henschke said that on occasions such as between harvest and seeding, when the farmer was not particularly busy, there was an excellent opportunity for him to give attention to such matters as machinery repairs, manufacture of hames, straps, split links, S hooks, &c. A little attention to repairs and improvements at such times often obviated annoying delays when the busy seasons were on. Members discussed the paper, and generally agreed with the opinions expressed.

MORCHARD (Average annual rainfall, 11in. to 12in.).

November 20th.—Present: nine members and one visitor.

Soldering.—Mr. F. Loftes read a short paper in which he said the requirements necessary for soldering were spirits of salts, salammoniac, soldering iron, and a pair of snips. The copper surface of the soldering iron should be smooth and free from cracks, and should be tinned by being rubbed when hot on a piece of salammoniac, and then rubbed in a little solder run on the salammoniac. Dipping into a solution of the latter and water, just before using, would put the iron into order. Articles to be treated should be cleaned with spirits of salts, and then wiped free of the latter. For kitchen utensils it was necessary to use spirits of salts in which zinc had been dissolved; for galvanized iron, spirits of salts; and for plain iron, tin, brass, and copper, spirits which had been killed. Members discussed the paper, and generally emphasized the necessity for thoroughly cleaning articles to be soldered before attempting the repairs.

NARRIDY (Average annual rainfall, 16.79in.).

October 23rd.—Present: 11 members.

Threshing.—Mr. P. H. Smart contributed a paper with the title "Does threshing pay when the price of hay is £1 15s. per ton in the stook." He took as a basis of calculation 50 acres of crop reaping 20bush, to the acre, or cutting for the thresher 30cwts. to the acre, and assumed that the cost of harvesting and that of cutting and stooking were about equal. A threshing plant could be hired, attended by the owner, at the rate of 4d. per bushel; the farmer finding the labor. The expenses to the latter would be three men carting the hay with two wagons, one man in the paddock pitching, and four men at the plant, a total of seven men. If the plant threshed at the rate of 300bush, per day, approximately three and a half days would be taken in handling the 70 (?75) tons. The cost would be:—Labor, seven men at 13s. 4d. each per day for three and a half days, £16 6s. Sd.; hire of plant, 1,000bush, at 4d. per bushel, £16 13s. 4d.; three bales of binder twine, £5 10s.; a total of £38 10s. The quantity of straw remaining after threshing was estimated at 39½ tons, as an

offset against the £38 10s., equalling 19s. 5d. per ton. The question then became one of comparison between threshed straw at 19s. 5d. per ton and hay at £2 in the stack, or £1 15s. in the stook. Members discussed the subject.

WEPOWIE (Average annual rainfall, 13in. to 14in.). November 23rd.—Present: 10 members and four visitors.

CARE OF FARM IMPLEMENTS AND MACHINERY .- This subject was dealt with in a short paper by Mr. F. Churcher, in which he said:—''A shed should be provided for all machines on the farm. This should be closed at least on three sides to for all machines on the farm. afford protection. Of course, this to some farmers would mean a considerable outlay of money, but whatever the cost it would be recouped by the lengthened life of the machines. An iron roof for this shed would be by far the best, as it would be the means of providing a good catchment of water; but where as it would be the means of providing a good catchment of water; but where great economy is necessary the straw-thatched roof would do. All exposed portions of both iron and woodwork should have a coat of paint where they have become chafed, and finally a thorough oiling should be given all bearings and working parts before the machines are placed in the shed. Breakages should be immediately seen to and repairs effected. By attention to these at once much serious injury, and perhaps complete breakdown, may be avoided. Occasionally removing all nuts and thoroughly cleaning all dry oil and dirt from both these and the threads of bolts and thoroughly oiling same before replacing nuts, thereby ensuring ease in reaching any parts or bearings when required, is recommended. Breakages to seed drills are frequently caused by starting the machine without first turning the wheat and manure cogs after a journey in wet weather. A canvas cover could be put over the drill at night and tied down. Two forked sticks about 2ft. 6in. long placed under the pole will hold it in a horizontal position, and thus prevent water getting in under the lids. A good method of preserving wagon wheels, &c., during the hot weather is to give them a coat of raw linseed oil. This will not only preserve the whole of the timber in the wheels, but it also prevents the spokes loosening. If these or similar methods are adopted on a farm there will be a great saving in the long run of both expense and trouble."

> WIRRABARA (Ave age annual rainfall, 18.91in.). November 13th.—Prese, it: 21 members and one visitor.

Darrying.—In a short paper on this subject Mr. D. Anderson said:—''In selecting a dairy cow I prefer a cross between the Jersey and Ayrshire or Jersey and Shorthorn, with a good large barrel and built on the wedge shape; the udder coming well forward with teats wide apart and brown in color. I would always avoid the buffalo type, that is the animal with the large fore quarters falling away to nothing behind. A cow should be kept in good condition when not in milk, for no cow can give her best results and put on condition at the same time. Sore teats also affect the milk supply, as also does the cattle dog or hard driving. The animal should be milked always by the same person at regular hours. I prefer to milk crosshanded; that is, a near front and off hind teat, and also wet-handed, as by dry-hand milking a cow cannot be stripped so thoroughly. The last pint given is the richest in cream content. The separator should be set to run the cream fairly thickly; for the thicker and richer the cream the longer it will keep fresh. It should not be run straight into the cream can, but into a smaller vessel and allowed to cool, as warm cream put in on cold has a tendency to sour. I feed the separator milk fresh to the calves and pigs, and find they do better on it than when it is allowed to become stale.''

AMYTON, November 23rd.—Mr. Gum initiated a discussion on the varieties of wheat suitable for the district, the best being Viking, Gluyas, Bunyip, and Federation. Members concurred in this opinion.

ORROROO, November 20th.—The meeting was devoted to the discussion of several questions of interest to members.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

LEIGHTON (Average annual rainfall, 16in. to 17in.).
October 23rd.—Present: 18 members.

Marketable Wheat.—A paper under this title was read by Mr. W. H. Turner. He contended that an essential for the production of a good sample of wheat was the selection of superior seed of the varieties proved most suitable for the locality. On no account should grain prematurely harvested be used for seed. Every attention should be given the cultivation of the soil. The stripper constituted the best means of taking off the crop, in his opinion. When the wheat was ripe, stripping should proceed rapidly, as a prolonged harvest might result in the grain becoming bleached, or a loss of weight might be experienced. He arged farmers not to be satisfied with merely producing a f.a.q. sample, but to market a product of the highest quality possible. The general effect of the f.a.q. principle might in some measure assist in raising the standard of inferior wheats, he said, but it tended to reduce prime wheats to the level of mediocrity. In concluding the paper read:—"Some system of the grading of wheat should be evolved. The grower of the best sample of wheat should be compensated for his care and diligence by an advanced price, and the best wheats should be narked off for export. If our position in the markets of the world is to be one of superiority and distinction the co-operation of every farmer is needed to produce a good clean marketable wheat."



YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA (Average annu ainfall, 15.22in.).

Present: 15 nembers.

HARVESTER VERSUS STRIPPER.—Dealing with the relative advantages of the harvester and stripper, in a short paper, Mr. W. J. Ortloff said the farm with up to 200 acres of good plain land would do well to procure a harvester to take off his crop, especially if labor were scarce. In hilly country, however, this machine was not a success on account of the variation of the pace and the tendency for the grain to run to one side of the screens. The chief disadvantages with the stripper were that it could not be used in the field until the straw was dry and brittle, and the labor necessary in cleaning. In the discussions which followed Mr. John Atkinson said a great deal could be said in favor of the harvester, especially in damp weather. The loss of heads was not so great with the harvester as with the stripper. In mallee country, where mallee shoots were thick, it became imperative to use the stripper. In his opinion the harvester had been a salvation to the Peninsula. It was a more complicated machine, and therefore required more intelligent handling. He instanced cases where inexperienced hands had lost more wheat than would pay their wages. The cost of repairs was also greater in the case of harvesters than with the stripper. He had noticed that the quantity of barley increased at a greater rate when using the harvester than with the stripper, which eliminated it more freely. Mr. W. B. Stacey advocated the use of the stripper in new country and the harvester in old country. Mr. W. J. Brinkworth said that where the size of the farm would permit he would use the harvester and stripper. His experience taught him that reaping could be safely commenced three days earlier with the stripper than with the harvester as the wheat would thoroughly ripen in the heap. Mr. A. B. Ferguson had used the harvester for 10 years, and had no desire to go back to the stripper. The harvester was a great labor and time saving machine.

WESTERN DISTRICT.

COORABIE (Average annual rainfall, 11in. to 12in.).

October 30th.—Present: nine members and three visitors.

SOME ENEMIES OF THE WHEAT PLANT.—The following paper on this subject was read by the Hon. Secretary (Mr. H. V. Hobbs):- 'Ine main factor in the production of profitable wheat crops in this district is, without doubt, a liberal rainfall: and this essential is outside the control of farmers engaged in the business. But even given a full average precipitation, we do not obtain the maximum yields that our soils are capable of, for the good results we ought to obtain are considerably lessened in a variety of ways, and particularly by enemies which attack the wheat plant itself, and either wholly destroy it, or weaken it to such an extent as to prevent the production of good sound grain, or even destroy the grain after it has come to maturity. These sources of leakage are more or less under the control of the grower, and if to-night we can discuss and thereby learn how best to prevent these leakages, the object of this paper will have been achieved. The troubles to which I refer, individually may not cause very serious loss, but when they are all added together it will be found that the combined forces take heavy ton or the To mention only some or the enemies rarmer—rar more than we really realise. whose attacks the wheat plant has to survive in the struggle for existence, we may take fungus diseases, weeds, adverse climatic conditions (apart from lack of rainfall), insect, animal, and bird pests. On the whole, the worst is the stinking Every farmer knows this pest, although its presence is not usually smut or bunt. discovered until the crop comes to be harvested. This fungus is usually introduced into the crop by spores adhering to the wheat seed with which it germinates, enters the young plant, and develops inside, coming to maturity as the plant ripens, and occupying the grain spaces, filling the husks with black, evil-smelling powder, instead of the perfect grain. Thus there is an absolute loss of grain, and, further than that, the value of what sound grain is produced is lessened by having bunt balls mixed with it and spores adhering to it, a fact with which the wheat buyers Fortunately science has attacked this enemy, and has very quickly acquaint us. shown us a certain and easy preventive. It has been proved that smut spores brought in contact with copper sulphate (common bluestone) are instantly destroyed, hence the practice of pickling seed wheat. A solution of 14lbs. of clean fresh bluestone to 10galls. of water is about the correct strength, and all-sufficient, provided the seed is properly wetted with it. But it must be done thoroughly. We should not use a pickling solution of greater strength than I have indicated or it will seriously affect the germinating power of the wheat. Because a seed sample is badly affected with smut it is a foolish practice to double or treble the strength of the pickle. If the solution is strong enough to destroy one spore of smut it is strong enough to destroy any number of spores. In pickling very smutty seed exercise great care, and do not increase the strength of the pickle, and remember the watchword is thoroughness. I prefer the McCabe method of pickling, but I consider it very important to thoroughly stir the wheat while in the solution, otherwise lurking smut spores will be effectively protected by tiny air bubbles, and thus not brought in contact with the bluestone. The bunt fungus does not injure the growth of the wheat plant, and therefore I would not trouble to pickle wheat seed sown for hay. Another fungus disease with which, to our sorrow, we are more or less acquainted, but which fortunately is not of such frequent occurrence, is the red rust. This fungus germinates in the soil, and preys on the wheat plant, sapping the latter's vitality and thus checking the development of the grain. Unlike bunt, rust shows itself while the wheat is still green, in fact at all stages of growth, provided weather conditions are favorable to it. At one time red rust threatened to ruin the wheatgrowing industry of Australia, but fortunately it was discovered that certain varieties of wheat, or individual plants in a crop, seemed able to resist the This fact was taken advantage of, and the rust-resisting plants selected and bred from, so that the general average of wheats grown in Australia to-day are far more rust-resisting than was the case a number of years ago. Damp, sultry weather seems favorable to the development of this disease, and soft-strawed wheats such as Federation, Rattling Jack, Yandilla King, and Purple Straw are more subject to attack than the harder-strawed varieties such as Gluyas, Urania King, Comeback, King's Early, and Le Huguenot. The very earliest varieties of wheat, as a rule, escape the ravages of rust, as they are too far matured by the time weather conditions encourage the disease to make headway. There is no known

remedy for rust; our best safeguard is to select very early varieties or those varieties known to be more or less resistant. A third fungus disease I will just mention in passing is takeall—a dread disease, well named when it does appear, but as far as I am aware this district has seldom if ever been visited. Once this enemy appears in the land the idea of growing wheat in that particular paddock or paddocks, for a year or two must be abandoned. If practicable oats may be grown, followed by early fallow, kept very clean, and particularly free from barley grass or spear grass. The following year it may be safe to try wheat again. class of enemy, weeds, and leaving out of consideration the native bushes which only cause trouble on new or fairly new scrub land, the most serious in this district are charlock or wild mustard and drake, while a word of timely warning should be uttered against the wild turnip, which has recently made its appearance here, and unless quickly taken in hand and stamped out is likely to prove more troublesome than either of the other two. The chief objection to weeds is that they rob the soil of food and moisture which is needed by the wheat plant, and the latter suffers in consequence. Drake can be kept fairly well under control by occasionally bare fallowing and keeping the fallows clean. Mustard is harder to deal with as the seeds, owing to their oily nature, will lie in the soil unharmed for years, ready to germinate at any time that soil and weather conditions suit. Persistent working of the land to encourage the germination of the seeds and the use of sheep as scavengers is about the best remedy when once this weed has taken possession. Until it has become plentiful in the paddocks, time in pulling up and burning isolated plants, is well spent. The wild turnip should it continue to spread, will give great trouble at stripping time. It at times grows taller than the wheat, and the tough, dry sticks of the ripened plant will cause chokes galore. Adversé climatic conditions (apart from lack of rainfall) which concern us are two-wind and frost. This district is notorious for wind, or it has been for the last few years. from the west, blowing clouds of dust and sand, play havoc with the young wheat plants on the lighter types of soil. These west winds in themselves are not harmful; it is the resultant drift that does the damage. It behoves all farmers on the mallee lands of this district to make the paddocks narrow from east to west, and leave good shelter belts of scrub at least two chains wide-better still three Exposed paddocks should be drilled first, so that the chains wide-round each. wheat plants may get a good start before the heavy winter blows commence. the spring come the hot, dry winds from the north, which, if they catch the crop just as the wheat is coming out into head, ripens off the grain before it has time to properly develop; blighted heads and shrivefled wheat result. Here is the risk in a district such as ours of growing late wheats. Frost has a somewhat similar effect to hot winds, causing dummy heads by nipping the plant just at flowering time; but I am inclined to think that our loss in this district from frost is practically It is a very exceptional year that gives us sharp frosts late enough to hurt the wheat plant. On the average hot winds cost us a hundred times more than frost. We now come to insect pests, and the only two that make a noticeable impression on our crops are caterpillars and grasshoppers, and they are by no means bad every year. When and where they are bad they are very bad, there's no doubt, for it is very little that we can do to successfully overcome the pest. Farmers in the more broken country bordering on open, grassy plains, are the ones who suffer. I have not seen either of these insects in great numbers on farms surrounded Their natural enemies, birds, are the farmers' best safeguard. by scrub. pillars threatened to be numerous in the early part of this season, but complaints soon died out, and for this happy state of affairs I am inclined to thank the ground larks and quail, which seem more than usually plentiful this year. Other remedies against caterpillar that have been more or less successful are the use of a heavy plain roller to squash the advancing armies, and the digging of fairly deep trenches along their line of march. A plague of grasshoppers is even more difficult to con-Sometimes they come in their millions, and clear every vestige of before them. I have wondered whether anything could be done in vegetable life before them. the way of spraying a strip of the crop in advance of the grasshoppers with a cheap poisonous solution, but probably the remedy, if practicable, would be more costly than the disease. The only animal which robs us by eating off our wheat crops is the rabbit. In clearing scrub paddocks I have found no difficulty in keeping the rabbit under hand, provided the land is well netted round as soon as it has been cleared. On the plain land in the open country it is a very different tale, and here, the weapons needed are wire netting, the poison cart, fumigator, the spade, and

Lastly the bird pests. I have carmarked three, viz., the crow constant vigilance. the ring-necked parrot, and the black magpie or bell magpie. The worst is placed first, the other two follow in that order. The crow and black magpie are always more or less destructive in the autumn and early winter by pulling up the young and tender wheat plants when they are an inch or two high. The ring-neck comes in at the other end of the play and helps itself to the grain while it is in the ear from the hay-cutting stage onwards, and later has a pretty little game on the wheat heaps so long as they are in the paddocks. I think these parrots are becoming scarcer in this district. It will be a pity if they disappear altogether, for they are decidedly ornamental with their brilliant colored plumage. However, the practical wheatgrower would prefer a few surviving specimens to be preserved in the Zoo rather than have a multitude feeding round the sides of the wheat field, making the edge of the crop look like a bad haircut. The crow, when all its faults and virtues are considered, may be fairly described as neither ornamental nor useful, and if some member can inform us of a practical method of exterminating this bird it will be advice well worth acting on. The black magpie has its nating this bird it will be address well world acting on. The back magnetic virtues, chief of which, from our point of view, being that he is not very numerous. We can afford to let him off with a caution. These, then, are a few of the enemies that our wheat crops have to sidestep. If we allow them all to go unchecked we shall be amateur wheatgrowers—doing the work without thought of profit. If on the other hand we are taking our business seriously, then we must of necessity wage strenuous warfare on each and every one of these enemies, and the more thoroughly we perform this the sooner will Australia's national debt be paid off. In discussing the paper, the Chairman (Mr. V. S. Kingsley) expressed the opinion that a 1 per cent. solution was quite strong enough to destroy bunt spores. Messrs. Giles and Riddle also thought the 1th per cent. recommended by the writer of the paper, too strong. Mr. Gurney had destroyed rabbits by placing traps around the fences. Mr. Stretton reported having inspected seven different varieties of wheat on one farm, all with the exception of Zealand Blue were affected with red rust. The Hon. Secretary recommended growing wattles on light, sandy land to provide windbreaks.

YADNARIE (Average annual rainfall, 14.09in.). October 23rd.—Present: 10 members and one visitor.

Mr. B. B. Crosby contributed a paper on the symptoms and treatment of enteritis. Haymaking.—In a paper on this topic Mr. J. H. Kruger said that land intended for hay growing should be thoroughly cleared and well worked and sown in April or early in May with 50lbs. of wheat, of a mid-season variety, The land should also receive a more liberal manuring than if it were intended to sow for grain. The best time to cut hay was when the grain had passed from the milky to the dough stage, the hay would then remain a good green color and contain sufficient sap to be most palatable to stock. Wheaten hay should be stooked a few hours after binding, but caten hay should be allowed to lie for at least a half day before stooking. He favored round stooks containing from 25 to 30 sheaves each. Hay should remain in stocks for 12 to 18 days, according to weather conditions, before carting. It was necessary to have a good layer of straw or timber on which to build the stack, which should be square-cornered, that type being easier to build and less likely to slip. The stack should be 15ft. to 18ft. wide, and the centre should be kept about 3ft. higher than the sides. The sheaves for the outside layers should be laid slightly on edge; all sheaves should be placed with the butts outward. The sheaves composing the eaves should be allowed to project 6in. to 8in. over the sides of the stack; the roof should be built with the butts of the sheaves outwards, and the middle should be bound up with the heads outwards. If the roof of the stack was to be covered with straw it should not be built too steeply or difficulty would be experienced in securing the straw. Mr. Spriggs urged farmers to clear thoroughly ground intended for hay growing. He had always secured the best results by roofing his stacks with the heads of the sheaves outwards. Mr. Brown emphasised the importance of building the centre of the stack high. The Chairman recommended thick sowing of wheat intended for hay. The Hon. Secretary (Mr. A. Jericho) and Mr. Francis favored early varieties of wheat for hay. In reply to a question, Mr. Kruger explained the "dog-leg-cross-finish" method of completing the roof of a stack. When the uncompleted portion of the roof of a stack was the length of a sheaf wide one sheaf should be placed lengthwise, and then two sheaves at an angle with the butts adjoining one another. This was repeated along the length of the stack.

YANINEE.

November 20th.—Present: 12 members and three visitors.

Grading Seed Wheat.—Mr. W. R. Mitchell read a paper on this subject. The grader, he said, was one of the most necessary machines in the farmer's outfit. Although a fairly good sample of wheat could be secured by putting the grain twice through the winnower, this would not eliminate a certain amount of cracked and small grain, that would be removed by the grader. "A good plump grain will grow a much stronger plant," he said, "than a grain that has not matured properly, and that is why one will notice, when going through a crop, so many dwarf heads; the delicate plants are unable to withstand the dry weather. I think a grader, when new, will cost about £40, and if several farmers were to purchase one between them, the cost to each would be light. I consider a bushel of graded seed as good as a bushel and a quarter of ungraded seed. All the cracked grain that is put into the soil is wasted; if taken out it can be very profitably fed to the farm poultry. A man sowing 300 acres or 400 acres each year would save a good number of bags, that would otherwise be wasted, by the use of the grader. I believe that in some places the district councils have secured a grader for the use of farmers. I understand that they can be worked by a small engine at a cost of less than 6d. a bag. In some of the best wheat-growing districts in Victoria, especially around Rainhow, very little seed is sown that is not graded. Two men can put through about 30 or 40 bags a day with fair going." The paper was discussed by members, who were divided in opinion as to the value of the grader.

EASTERN DISTRICT. 'EAST OF MOUNT LOFTY RANGES)

GLENCOPE.

December 5th.—Present: seven members.

The subject of co-operation was discussed, and it was resolved to get in touch with the Clare Branch for information of that Branch's experience on the subject. Mr. C. A. Evans initiated a discussion on the value of cocky chaff and straw as fodder. He contended that if farmers would save their chaff and straw and store it carefully from year to year they could not only keep their stock alive during bad seasons, but could, by a little addition, work their horses and keep them in good condition. If working horses were given about two kerosine tins of chaff, 14lbs, pollard, and 4lb. molasses three times per day and hay for the night feed they would do better than if fed on hay alone. He used 2lbs. of molasses in 3galls. of water to moisten a meal as above for eight horses.

MANTUNG.

November 18th.—Present: eight members.

Economy in Starting a Farm.—In a paper on this subject, Mr. W. Stewart said—"I believe that a good deal of money and worry could be saved by the new farmer in the manner in which he sets out for the first few years. The tendency seems to be to secure a six-horse team with big implements for which he has not sufficient work at the start, which means in this class of country, which is heavy to clear, a lot of capital tied which could be better employed in the initial stages. Four working horses, not heavy draughts, are sufficient for the first couple of years. The lighter class of horse would do better in the early days on the scrub, and would not require so much feed as the heavier horse, thus showing a big saving in fodder, especially when it has to be purchased and carted any distance. Later on one can purchase the remainder with more weight and strength to make up his requirements. Before purchasing implements it would be well if he thoroughly thrashed

the question out, and after having decided refrained from altering his mind at the last minute on some chance remark which might cause a big mistake, always remembering that the best is cheapest. He should not order implements or plant a long way ahead of requirements. I think it also wise for the beginner to avoid new ideas in implements until they have been thoroughly tested. He should not trust to memory in managing the farm, but keep a record of everything, even to the number of eggs the fowls lay, and the cost of feed to them. By this means alone can he tell if they or any other branches of the farm are paying their way. foolish policy to grow wheat to feed to stock and poultry if they do not show a return over cost. As soon as he finds that any of his side lines are not paying he should either make an alteration or pass them out, and not hesitate even if it is his One way to avoid too much outlay at the first is to work in with neighbors, either in jointly owning a lot of the plant, or each purchasing their own and not duplicating them, in order to have one complete plant. In purchasing co-operatively the time and rotation for use when necessary should be recorded, also a few rules which would perhaps be the means of avoiding misunderstanding." Mr. E. Hannaford considered four horses insufficient for starting a farm. Mr. J. P. Tonkin said that farmers might co-operate with neighbors in the use of horsepower, thereby doing with fewer horses. Mr. L. J. Pearce agreed with record-keeping in connec-Mr. Stewart, in reply, considered four horses up to 150 acres. The Branch decided to carry tion with all farm enterprises. ample for the first year to deal with up to 150 acres. The Branch decided to carry out competitive work among members during 1916. It was also decided to promote a "field trial" of cultivating implements early in the new year.

NETHERTON.

November 20th. Present: eight members.

Indian Horse Trade.-Mr. Ferguson read a paper as follows:--" Although most of you are aware of the existence of the horse trade between this country and Australia, probably few of you have ever considered its connection with your own particular sphere. Having spent several years in this trade, I shall endeavor to explain matters generally in connection with it. In the first place, there are two markets for horses, viz., private market and Government, each requiring distinetly different types of horseflesh. With the exception of a few thoroughbred polo ponies and racehorses from England, and Arabs from the Persian Gulf, the whole of the Indian horse trade is connected with Australia. In addition to these there is bred in India a type of horse commonly called the 'country bred' (a word which in that country means inferior). This is certainly a type of its own, being at once weedy and badly proportioned, and having all the vices—with numerous additions—and few of the virtues of the horse as we know it here. The country bred does not usually attain greater height than 15 hands—the majority being under 14 hands—and probably the only thing that this animal can claim to its credit is stamina, being unusually hardy, due undoubtedly to its being the natural product of the country. Many thousands of horses are shipped from Australia annually, the majority, of course, on order from the Indian Government, comprising for the most part animals suitable for artillery (gunners) and native cavalry regiments, the latter class being better known as remounts or bounders, the majority of which are drawn from Queensland, New South Wales, and the northern parts of this State. A good active medium makes the best artillery horse, a good idea of what is required can be imagined by those who witnessed the purchasing of horses by the Imperial Government representative who travelled the farming districts during the early part of this year. Remounts are a light, strong stamp of saddle horse of no particular breed, from, sav, 15 hands to 16 hands, providing they are sound. Soundness is a most essential point with the remount authorities, and as good sound animals of the above classes -more particularly the former-always bring the maximum prices, especially during the visits of the Indian buyers-Sentember and October-farmers would be wise to give this matter careful consideration when purchasing stock for breeding purposes. Private sale horses include polo ponies (13.2 to 14.1), trappers hunters, and officers' chargers: but as all export of horses from Australia. except for Imperial purposes, has now been prohibited by the Commonwealth military authorities, this market is closed pro tem. Draught horses are unsaleable, all cultivation and transport being carried out by bullocks, buffaloes, and motors. It is generally considered necessary for a horse to have been landed 12 months before he is properly acclimatised. Regarding the feeding of horses, wheaten hay and chaff are unknown, except in small quantities imported from Australia for racehorses and polo ponies. For ordinary feeding purposes crushed native cereals (a mixture of gram, pilky, linseed, maize, oats, and bran) are used, supplemented by a native grass called hay, but with very little substance. About 25lbs. of this grain fodder is considered a fair day's allowance. Molasses is also used in large quantities; and, as I have informed members on previous occasions, Epsom salts play an important part in the Indian horse world, where it is considered a stable

necessity, and I would advise its use more generally on the farm."

The Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.), who has had considerable experience with Indian conditions, commenting on the above paper, says:—"This is evidently the expression of opinion by a man on the spot, but present conditions are so abnormal that it is of little help to the farmer. Probably when the market is reopened it will not pay a farmer to breed for this market, as home prices will be high, and only station breeders will find it profitable. The country-bred, as described by the writer, certainly may be found in the towns, but the history of the Marrhatta and Afghan wars has proved their value. The trouble in breeding in India is not so much lack of suitable food as lack of horse sense; where this is obtainable the Indian-bred horse is a better animal for the country than the Waler; 25lbs. of fodder as described is double the Bombay allowance, but probably meets the requirements of the horse and his syce. Nimak or salts is regularly used, again, possibly more by the groom than his charge, as it is excisable, it has an exchange value in the bazaar."

PARRAKIE (Average annual rainfall, 16in. to 17in.). November 20th.—Present: 13 members and two visitors.

Gathering Seed Wheat.—Mr. A. J. Beelitz, in a short paper, expressed the opinion that seed wheat should be reaped with a damp-weather stripper, and cleaned with a hand winnower. If the grain were gathered with a harvester there was a danger of the germinating power of the seed being destroyed through careless working. In addition, the harvester could be used after a rain, when it would not be practicable to use the stripper, and if the grain gathered at such a time were kept for seed, there was a probability of a large part of it being destroyed by weevil. In discussing the paper, Mr. Jose mentioned that he had picked several handfuls of heads and put them in a sugar bag. He left this in the sun, and then thrashed it against a post, and winnowed in a tub with a big wind. This seed was sown over half an acre of ground, and showed a remarkable germination when compared with that of seed treated in the ordinary harvesting manner, and yielded 12 bushels. The speaker felt satisfied that the less handling grain got the better, so far as seed wheat was concerned. Most of the members who joined in the discussion favored the use of the stripper for seed wheat, whilst a few thought no material difference was noticed if the harvester were driven carefully. The writer of the paper, in reply, said he had driven both machines, and always noticed that the stripper sample grew thicker and showed a more even germination.

PINNAROO (Average annual rainfall, 16.74in.).

November 5th.

Mr. E. H. Parsons contributed papers in which he explained the provisions of the Fences and Brands Acts, and in addition, outlined the provisions of the Bush Fires Act.

SHERLOCK (Average annual rainfall, 14in. to 15in.). October 13th.—Present: six members and six visitors.

Notes from Authorities on Pig-raising.—The following paper, under this title, was presented by the Hon. Secretary (Mr. J. C. Genders):—In connection with pigraising, as indeed with any other line, everything should be arranged in a methodical manner, and with a view to saving labor and to thorough cleanliness. Good animals, good feed and care, are just as necessary to profitable pig-raising as they are with the dairy herd, sheep, poultry, &c. Sties should always be clean, dry and

warm in winter, well ventilated, but free from draughts. They should face northeast, and have a roof say 5ft. high in front, sloping back to 4ft. 6in. of the sty should be, say, 8ft. from front to back, and 10ft. long. This will give good accommodation for six or eight fattening pigs or a sow with litter. should be of concrete, with a false wood floor for greater warmth in winter. be built on sloping ground in order to carry water away when the sties are being hosed, which should always be done when necessary. Always have a little run to In summer an open shed with a straw roof or other shade is absoeach sty. The pig is a non-sweater, and feels the heat more than animals lutely essential. that perspire. A small railing round three sides of the sty, 6in. high, and 8in. from walls to allow the little pigs to get out of the way of the mother is an ad-Let plenty of sun get into sties, especially in winter. The boar should have a separate sty, and be kept away from sows. Handle him kindly, but let him understand that you are the boss and you will have no trouble. Fresh bedding should be placed in all sties when necessary, and the sties should be treated frequently with lime. The profitable pig is the comfortable one. Paddock and Runs .-It is advisable to give pigs plenty of exercise except when topping them off for market. Have a good run for them, including a little scrub if possible. If they are lazy, and hang round the sties, drive them into the scrub until they get accustomed to it. Also have several small paddocks off the main run in which to grow root crops, lucerne and other green feed. Put in several rubbing posts in the In America pigs are turned out to pasture, as is done with horses and Fix the yards so that the boar can have a run w.thout being allowed near the sows. The sow should come in two weeks before farrowing, but should still be allowed a small run adjacent to the sty. Breed.—A pure-bred boar is recommended. A pedigree sow is advisable, but not so necessary. A Berkshire boar and Yorkshire sow or vice versa are favorites. A Yorkshire boar will produce white The sow should have at least 12 teats, pigs which are worth more on the market. and if she is a proved good milker, should be retained until she fails to give good The sow will breed when six months old, but some say it is time enough to start when the animal is 10 months old. The period of gestation is 16 weeks and three days, and the aim should be to get two litters per year, this allows 10 weeks in which to mate up for each litter. The sow should be served about a week after three days, and the aim should be served about a week in which to mate up for each litter. The sow should be served about a week the litter is weaned. The average litter is about nine. If falling below eight to boar can work at six months, but should not be given too much to do. Some authorities say it is early enough to start at 10 months. In-breeding is undesirable. Neither the boar nor the sow should be allowed to become over fat. At farrowing the sow should have a quiet, dry and warm place, and be treated with great care and kindness. It is a very critical time for her and the little ones. After it is well over, and she is lying easy, do not disturb her. She will require little or no food for 24 hours. If she has been properly fed Nature has provided for her. On the second day she should have a few quarts of warm water, and then for four days warm feed of milk and bran and a little pollard, but no grain. The quantity should be gradually increased, but not to make more milk than the piglets will take or there will be danger of milk fever. The average weight of piglets at birth is between 21bs. The males should be emasculated at three to four weeks old, and for to $2\frac{1}{2}$ lbs. this work cold, damp weather should be avoided. Marketing, &c.—The pig farmer should aim at large litters and forcing early maturity and quality. The animals should be ready for market before they are eight months old. The earlier the better. Pigs weighing from 70lbs. to 80lbs. return the most profit. A day's neglect may make a lot of difference. With good management pigs can be raised to 60lbs. live weight in 10 weeks. The only way money can be lost is by trying to save the food. It will always pay to buy if one runs short. In raising young pigs for market, get them to consume as much as possible in as short a time as possible, seeing that there is a little left in the trough after they have done. will be gone before we go to feed them next time. When sent to market pigs should be protected from the sun and given a good hosing; they should not travel on a full stomach. Feeding.—Dividing the pig's life into two periods, the first should be devoted to building up a good constitution, and the second to fattening off for market. In the first period particularly the pig should be allowed plenty of exercise. The essential accessories to good feeding are plenty of water for drinking and bathing (both cool and under cover), grits and licks. The food to be given will largely depend upon the farmers' stocks on hand. As a general rule

it may be stated that a variety of food is good, although the changes should be gradual, not sudden; that a mixed diet is preferable to a simple one. A good proportion of the foodstuffs given should require chewing. Potatoes should be cooked, but with this exception the food should be soaked, not Cooked food may be a little more digestible, but there is a big loss of Food just warmed up is very nice for a change, especially in winter. Moistened food is good, but dry food should also be fed, as it produces more saliva and assists digestion. Here it may be interesting to note the report that nearly all pig breeders in U.S.A. and Canada have installed an invention called the hog motor, and that it is becoming very popular in England. It is a galvanized iron cylinder in which is an appliance for grinding wheat, barley, beans, &c., placed over the trough. The pigs learn to work for their living by revolving it, thus releasing a small quantity of dry meal. Milk food gives best results, flour mill by-products not being so good. Much bran is not recommended, although useful as a bowel regulator when green feed is scarce, and for sows just before and after farrowing with not over half a pint of castor oil two days before. Root crops are of great They will keep the pigs busy. A liberal allowance of green feed is said to be the secret of early pork. If we keep the two 6's (grain and grasses) in mind we shall not go far wrong. If food is stinted between the fifth and twelfth week it is likely the pig will become a poor doer. Piglets must be weaned gradually and not until they are eating well, which should be at eight weeks old. There should be a little separate pen with a creep hole for the little pigs to go in when about three weeks old, and feed undisturbed by the mother. Care should be taken Whole milk is better. in giving skim milk to pigs just leaving their mother. When weaned they should be fed by litters at first, and later with other litters of They should be put on pasture when 10 the same size in a separate compartment. Grain prepared in the following way is claimed to be more easily digested than raw grain, and of higher feeding value. Pour hot water over it, and after thoroughly soaking it cover it over for two or three days until the grain has sprouted, then feed in a separate trough without any swill or liquid. The best food for a brood sow is said to be reground bran made into a stiff mess with skim milk or kitchen slops or water. The pigs should be topped off for market on a hard grain diet. The following is a list of available grain in order of merit:—Barley, oats, wheat, maize. Sloppy food should not be given, nor food in excess of requirements. Peas should be fed crushed, not whole. Barley always crushed and soaked. Water in which potatoes have been cooked must not be given. Pollard soaked or scalded. The pig's stomach is small, therefore the tendency should be towards fairly concentrated food (not sloppy), and at least three meals a day are strongly recommended. In feeding milk and sloppy food be careful to avoid scouring. Two lbs. of whey is equal to 1lb. of skim milk if fed with meal; 3lbs. of whey is equal to Daily Rations Recommended .- At from one to two months they 1lb. of meal. should receive whole milk mixed with pollard and a little fine ground or soaked corn fed sweet and warm about temperature of sow's milk, and subsequently the following rations:—2-3 months weaners, 9lbs. skim milk, 1lb. pollard, 1lb. barley, divided into four feeds; 3-5 months, 6lbs. skim milk, 2lbs. barley, 2lbs. wheat, divided into three feeds; 5-6 months, 3lbs. skim milk, 34lbs. barley, 2lbs. wheat, divided into four feeds; 6-7 months, 54lbs. barley, 14lbs. wheat, peas to top off, divided into five feeds. The following rations are also favored by pig raisers:—(a) 31bs. of separated milk to 11b. meal; (b) 1gall. skim milk, 3lbs. potatoes (cooked), 4lbs. barley meal, or equivalent divided into three feeds; (c) skim milk, barley meal, pollard; (d) 63 lbs. pollard, 22lbs. skim milk, llb. bran (also peas); (e) soaked hay chaff; (f) lucerne chaff, soaked and mixed with pollard; (g) bran and pollard, consistency of porridge, skim milk to drink; (h) skim milk, pollard, oats, green feed; (k) 4lbs. each green feed and meal daily; (1) molasses 11b. per day with other food, but it is not recommended to feed molasses to brood sows; (m) for fattening, lucerne chaff, molasses, pollard; (n) for fattening, sunflower seed, maize. Mr. W. J. Spafford recommends the following fattening, sunflower seed, maize. Mr. W. J. Spatford recommends the rollowing rations for quickly fattening young pigs, per 100lbs. live weight, per day. Fed a little sloppy first, then thicker; (0) 1½lbs. wheat, 1lb. barley, 20lbs. skim milk; (p) 2½lbs. wheat, 2½lbs. barley, 1lb. pea meal, water. Grits and Licks.—The following are recommended:—(1) Ashes; (2) bonedust; (3) charcoal; (4) lime; (5) superphosphate; (6) a tonic mixture, 20lbs. finely-sifted ashes, 4½bs. salt, 1½bs. superphosphate; (7) a mixture, 6 parts charcoal, 2 parts wood ashes, and 2½bs. salt and ½lb. copperas to each bushel. [Note.—A pig breeder states that if the

pigs have a twist in their tails they are doing well, but if they hang down straight they want charcoal.] Table of Average Cost and Weight:—

•	Average cost	Average increase of
	per lb.	weights per week.
Birth to 10 weeks		$5\frac{1}{4}$ lbs.
10-16 weeks	$1\frac{1}{2}d$.	84lbs.
16-24 weeks	1\frac{4}{2}d.	$10\frac{3}{4}$ lbs.

[Note.—When grazed on rape cost should be less. Pigs 4 to 5 months' old (porkers) should weigh 70lbs. to 90lbs.; 6 to 7 months (baconers), 120lbs.] What the authorities say about the points of the ideal pig, the size of the body, shape of head, length of neck and legs, &c., is all very interesting, but I venture to suggest that it will be more profitable for us to look into these at a homestead meeting with the pigs in front of us. Nor have I attempted to discuss the diseases of pigs and Perhaps some other member will deal with these at a future meeting. I am inclined to the view that if we take a proper interest in "the gintleman that pays the rint," keep the quarters thoroughly clean and comfortable, provide plenty of fresh water and shade in summer, and a constant supply of grits, we shall not have occasion to do much doctoring. Permit me, however, to quote two remedies for pig lice. Mr. F. E. Place, the Government Veterinary Lecturer, whose notes in the Journal are of such great value to farmers, says we should spray or scrub with an emulsion 4galls. of soft water, 11b. softsoap, and 4ozs. Another popular treatment is the kerosine emulsion. Dissolve 3lb. sheep dip. of hard soap in 2 quarts of boiling water, add 1 pint of kerosine, stir thoroughly, add three quarts of water. Apply thoroughly with brush, cloth, or sponge all over body, repeating treatment in about six days. Pigsty to be thoroughly cleaned and disinfected; bedding, &c., burnt.

SHERLOCK (Average annual rainfall, 14in. to 15in.).

November 20th.—Present: six members and eight visitors.

The first homestead meeting in connection with the reorganised Sherlock Branch of the Agricultural Bureau was held at the homestead of Mr. J. P. Trezoni, and members and visitors were much interested in what they saw. The wheat and oat crops were, on the whole, looking well. A patch of Hunter River lucerne put in in September had made splendid headway. The herd of fourteen cows and bull and the farm horses and six pigs were looking in first class condition. There was plenty of feed about, and dry feed should be available for some time. A hearty vote of thanks was passed to Mr. and Mrs. Trezoni and the ladies (Mesdames Partridge, Hoad, and Stringer) who had assisted in entertaining the visitors.

STIRLING'S WELL.

October 23rd.—Present: 17 members.

Fallowing.—Mr. F. Peake contributed a paper on this topic. He said that for winter and spring fallowing the land should be ploughed to a depth of 2in. Plough shares should be in good order to make a satisfactory job, and turn in all the weeds. Drifting of fallow often caused a great deal of trouble, and to prevent this, he recommended ploughing land fairly deeply with the furrows double the usual distance apart. Autumn fallowing should be done in March or early April, with a cultivator, following it with the harrows. After seeding, the land should again be cultivated across the earlier work, and if weeds were plentiful the harrows should again be used, or preferably sheep put or the land. If weeds were troublesome in the late spring, the land could again be cultivated. He did not think fallowing operations would give satisfaction until the bulk of the shoots were killed and a good proportion of the stumps were removed. Discussion ensued, various opinions being expressed regarding the depth to be recommended for fallowing. Some members favored ploughing as deeply as 6in., while others thought that $2\frac{1}{2}$ in. to 3in. was ample.

STIRLING'S WELL.

November 20th.—Present: 12 members and three visitors.

PREPARATIONS FOR SEEDING.—The following paper was read by Mr. H. Kirkbank:—"Immediately the harvest is completed preparations must begin for seeding operations. In the case of new mallee scrub farms, where not enough

cleared land is available for fallowing, it is a good plan to begin burning off scrub and stubble land, either by fire raking or otherwise, as soon as possible after the 1st February, always choosing the hottest days possible; this being an important factor in securing a good burn, and a good burn helps towards a good crop. This completed, the plough should be started and kept working where dry ploughing can be practised, so that as much land as possible can be got ready before seeding begins, and no time is lost with ploughing when the favorable weather and time for seeding begins. It should be always kept in mind that crops sown just at the right time will return the best yields. A cultivating plough of from six to 10 furrows set to a depth of $2\frac{1}{2}$ in. or 3in. can be successfully used for this operation in light soils, and in heavier soils a heavier plough should be used. In the event of a good rain falling before seeding and starting rubbish and self-sown wheat, a wide cultivator should be worked In order to make this practicable a man should be employed ahead of the drill. picking stumps and large stones while ploughing is in progress, so that no valuable time is lost at seeding time. Oats should be first sown. If required for grazing the latter end of March is the best time, otherwise the 1st April is early enough to begin. These should he in by the 15th April. When sowing wheat the farmer should commence with late varieties for grain, or early varieties for hay. The different varieties of wheat should come in rotation down to the early varieties, which should be sown last, except where shallow stony land exists; here early wheats should be sown as soon as possible after the 1st May in order to give it a chance to come out in ear before a probable dry spell in the spring could cause it to blight. Seeding should, if possible, be completed by the end of May. The best kinds of super should in all cases be used; those most adapted to different classes of soils should be ascertained. I recommend sowing Solbs. to the acre on light soils and 60lbs. on heavier or stony land. Much difference in opinion exists as to the quantity of seed to sow to the acre. Thick sowing should, in all cases where light soils exist, be avoided. The greatest loss may be experienced through it, not only by loss of superfluous seed, but the returns are also affected by over-crowding. From 20lbs. to 30lbs. of oats to the acre is sufficient; with wheat, 30lbs. for late varieties and 40lbs. for early varieties will give the best returns." In the discussion it was pointed out that the reason for sowing early wheats on stony land was that in the event of an early dry spell the early wheats had a better chance of maturing than the late ones, for the stony land was always the first to be affected by a dry spell.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (average annual rainfall, 27in, to 29in.)

November 22nd. Present 13 members.

SPRAYING.—A paper was read by Mi. G. W. Summers, in which he said:—
"With winter spraying, a much stronger, solution can be used, and personally I believe apricots are much improved by a good autumn or winter spraying while the buds are dormant. The general appearance of the trees is better and cleaner and the dormant buds are more vigorous. Quite a number of opinions are stated in reference to the effect of Bordeaux on the bark of the trees. W. J. Allen, Department of Agriculture, New South Wales, says, 'Bordeaux appears to have a more lasting effect than lime sulphur, but it renders the leaves harsh and has a certain detrimental action in retarding the free growth of the tree.' Another opinion says, 'scientifically, it improves the tree, invigorating it.' Another, while admitting the hardening effect of the constant use of Bordeaux, advises the use of oil as a winter spray to soften the bark. Many growers advise using the various sprays separately; Bordeaux for black spot, etc., and arsenate of lead for moth. They contend that separate they are more effective, while on the other hand a member of the staff of the University of California says, 'Arsenate oi lead is improved by mixing with Bordeaux.' The general opinion seems to be that winter spraying for black spot is useless, because the spores of fungi are not destroyed when in a dormant condition, but when they are sprouting, in spring time, the best time being when the cluster buds of the apple have opened wide to allow the spray to penetrate to each separate flower stalk. It is very important

that the operation should be thorough, the spray being forced into each blossom Mr. J. H. Jacklyn, of Tasmania, says, 'I bought an orchard 14 years During the first two years I did not pick one case of clean fruit, the whole being covered with black spot, both apples and pears. I was advised to spray with Bordeaux (5-5-40) just as the blossoms were opening, but important business intervened, and when I was able to spray the blossoms had commenced to fall. Neighbors said that if I kept on spraying trees in that condition I would burn off all the fruit, but I continued the spraying. By the time I had finished spraying there was no bloom. Many growers came week after week to see the result of my foolhardiness, as they termed it, but, to their surprise, the fruit set, and that well, and no sign of spot. I eventually picked a perfectly clean sample of fruit. sprayed the following year, leaving a small portion for experiment, which showed slight spot. I left unsprayed the same portion the following year, and as I think the constant use of Bordeaux stunts the growth as well as rusts the fruit. He finds it necessary to use the full strength for Jonathan, King David, and others (2.2.40). Mr. A. Kieselbach, of South-East, South Australia, had similar experience in an old orchard of Cleopatras. It seems that the great value of distinctly winter spraying is to combat red spider, woolly aphis, peach aphis, etc., and the best spray appears to be red oil, as in addition to killing these pests, it softens the bark, thus counteracting the ill effects of Bordeaux. Secretary (Mr. C. G. Savage) detailed results of experiments which had been carried cut at the Coromandel Valley Orchard.

FERTILISATION OF FRUIT BLOSSOMS.—Members were of the opinion that the early blossoms set better than the late flowers on the same tree. The Jonathan apples set better when the trees were not pruned until they were in leaf. Jonathan apples on the whole had set well, while the Dunn's seedling crop was light.

CHERRY GARDENS (Average annual rainfall, 35.03in.). November 16th.—Present: 13 members and one visitor.

Suggestions for Dealing with Surplus Fruit.-Mr. S. W. Chapman contributed a paper on this subject in which he said:—"It is my intention to-night to offer a few suggestion that, if acted upon, may help to relieve local markets of a great quantity of fruit, and help to avoid that glut which so often occurs in years when we have such a heavy crop of fruit as is promised for the coming season. Knowing that these periods of glut are not due, as is often stated, to over production, but to lack of proper methods of marketing and distribution, I believe they could be greatly overcome if more were done in the way of drying, canning, storing, and by the growers getting into closer touch with the actual consumers; and whilst believing these things could be best dealt with by the growers in different centres co-operating on similar lines to those laid down by the delegates from Angaston and Forest Range at our Hills Conference 12 months ago, when advocating the formation of packing centres in connection with apple exporting; still, until this reform comes about, I believe individual growers could do a great deal to relieve the situation by adopting one or more of the above suggestions. Regarding drying and canning, it is not necessary for me to go into the particulars of the various methods in vogue, for excellent pamphlets explaining the processes can be obtained from the Agricultural Department for the asking, but I simply point out that with both these processes a great deal of the second grade fruit can be dealt with thus keeping it off the market, and thereby making a better market for our first grade fruit. Also there is a good local demand for all kinds of dried fruits, as is proved by the fact that this State at the present time has to import a very considerable quantity. Considering we are a fruit-producing country this should certainly not be the case. In regard to storing our fruit we are certainly very much behind our neighbor, Vietoria, for in that State nearly every fruitgrowing centre has its cool store, some erected by the Government, and some privately owned, where the fruit can be stored at a very cheap rate, and during periods of glut can be held, and thereby regulate the market. In the case of periods of glut can be held, and thereby regulate the market. In the case of apples, of course, certain varieties can, if picked carefully, with no bruises and no punctures of any kind for moulds to find entrance, be kept for a long time without cold storage, but with cold storage one can extend the season, and those fruits that are not quite so perfect will be preserved in better condition. Victorian growers state that the value of these stores is incalculable, for instead of having to rush their produce to market as it ripened, no matter whether the markets were glutted

or not, they can hold on to their fruit until the market rights itself. If growers would carefully study the history of the past and review the present position, they would see that the remedy is in their own hands, namely, co-operative district associations for canning, drying, cool storage, and exporting. Low prices are mostly our own fault, we have too few avenues for the disposal of our produce, and Undoubtedly our greatest efforts have no manner of conserving our resources. been devoted to the bettering of our methods of production, and in this we have In marketing methods, however, things are very different. been most successful. In its rapid increase the industry has outgrown the old system, or rather, lack of system, that did very well when the industry was small. Practically everyone connected with it realises this. It is only a question of what practicable remedy will prove most advantageous." Mr. C. Ricks favored the erection of co-operative drying and preserving plants in districts where large quantities of fruit were Waste fruit could be profitably fed to sheep and pigs, he said.

HARTLEY (Average annual rainfall, 15in. to 16in.).

November 17th.—Present: 14 members. FENCES ON THE FARM.-Mr. W. Birmingham read a paper on this subject.

advised a 3ft. Sin. fence, with a barbed wire on top, secured to the post with wire; the wires then being the following distances respectively from the barb:-1lin., 8in., 7in., 6in., 6in. for sheep; four wires would be found sufficient for horses and cattle. Mountain or red gum Wood and iron posts, alternating, should be 10ft. apart. provided the best wood for posts. These timbers were not so liable to be destroyed by white ants as the blue gum. Care should be taken to select red gum from trees growing on hills; these were not so short-grained as trees on flats or along creeks. Round posts were not so serviceable as split. Members thought that two barbed wires would provide more protection to the fence. Iron posts soon rotted when placed in sand. Hollow wooden posts should be split.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.). December 5th.—Present: 12 members and one visitor.

TREATMENT OF HORSES.—The following paper was contributed by Mr. H. J. Meyer:—'Although motor power is used a great deal on the farm at the present day, it will be a very long time before it replaces the horse as a means of traction, therefore as good draught horses cost money, and are a very valuable asset it is essential that the farmer should give them every care and attention, and also see that he begins on the right lines as to breeding, &c. Now to get the best and most economical results I take it that one must commence at the very beginning, and breed his own stock, as it is very much more satisfactory to do so than to buy. for no other reason, the farmer has an opportunity of seeing the youngsters grow up under his eye, and is therefore able to study their temperament, which will be of very great assistance to him when the time for breaking in arrives. But I wish it to be understood that I am not advocating the breeding of horses as a grazing proposition simply, as we cannot surpass sheep in that respect, but on every wellmanaged farm a certain number of young horses should be reared to replace losses, and add to the size of the teams when required, and to be placed on the market when not wanted. Almost the most important feature for the farmer to consider in breeding is the selection of the mares from which his stock is to be raised. Like produces like, and this applies equally to the dam as to the sire, but strange to say a great many will put any and every mare they have, irrespective of size or type, to the stallion, and then be disappointed at the result. I consider that the policy of selecting three or four of the best mares every year, and breeding from these is the best. In this way the farmer is breeding the best possible stock from the material available, and I am certain the result will be most gratifying to him. Foals should be weaned at about five months old, taught to lead and tie up, and be kept in a loose box, where they cannot injure themselves; fed on good nutritious food, and have plenty of water to drink. My experience is that they soon become accustomed to being confined, and do not fall away in condition, and also that they soon become very quiet, especially if one can devote a few minutes every day to handling and grooming them. The foal never forgets the treatment, and it makes the process of breaking less difficult. Foals should never be allowed to become stunted, for in that case their digestion will become impaired, and they will be less able to resist disease. After say about six weeks they can be turned into a good paddock with the other horses. I will now devote a short space to the breaking in of the young

animal, for on the care and thoroughness of this operation its future usefulness entirely depends. The importance of properly training horses for farm work is not sufficiently recognised. Many horses that have turned out 'wrong 'uns' or jibbers have been made such by careless and cruel treatment during the schooling or breaking-in period, in which case the farmer and not the animal is entirely to blame. The making or spoiling of the horse commences from the time it is a foal. ness, with kindness, is essential. One should never shout at or bully the young animal, but of course, it must be mastered, which the youngster will soon realise. Having followed the horse from its birth, we come to its most profitable time as a worker. Stabling is one of the first factors to consider. It is necessary to provide a good and comfortable stable with plenty of light and ventilation. It is also important that the stable should be kept clean and well drained. The roof can be of iron or straw, according to the state of the farmer's finances. Iron looks better, and is safer against fire, but not so cool as straw, and with the latter the tempera-The value of grooming is also considerable. The harness ture is more even. should be well cared for, especially the collars, which should be well fitting. There would be less trouble with sore shoulders if the horses were kept in better condition, and special care taken to see that the chains were of equal length, and also that the implements were rather overhorsed than underhorsed. How can one expect to get the most out of the teams if the half of them are working under such adverse conditions. From a business point of view alone (leaving the humane side out) it is not good business surely; the team will take more feed to keep it in condition than if it were working comfortably. It has often surprised me to see what little interest and care some men take in their teams, and it is a regrettable fact that very few farmers, particularly the young men, take any pride in their teams, and draught horses as a hobby is quite out of the question. I feel sure if more care and interest were taken in the horses they would be the fitter to get through more work, which, after all, is the main consideration with us all. Another factor in getting the best results from the teams is not to have quick and slow workers to-The fast horses become irritated, and the slower ones are likely to be put out of their natural pace, facts which do not conduce to the well being of the team. I know it will be said it is difficult to ad, it the team to evenness of pace, which I admit, but I think in time, by selling the nar-aways when an opportunity occurs one could overcome the difficulty somewhat.

KANMANTOO (Average annual rainfall, 17.90in.). November 20th.—Present: nine members.

SELECTION OF SEED WHEAT .- Dealing with this subject in a paper, Mr. R. W. Downing said:—''Does seeu wheat and endeavor to give you a few reasons why.

At the outset, 1 am not across the endeavor to give you a few reasons why.

This is undoubtedly a specialist's job, Downing said:-"Does seed wheat need selection? but I am sure every farmer can do a little towards improving the standard of his seed wheat. The strongest reason why seed wheat should be selected is that it follows exactly the same course of reproduction as is the case with animal life. If the farming community as a whole could be brought to realise the importance of this fact an improvement would soon be effected. How have our South Australian Merino sheep been brought to the high standard that they have attained, think you? By indiscriminate mating and indifferent treatment? Certainly not; but by careful and skilful selection and attention. Wheat requires just as diligent attention. Again by selecting and grading, and in selection grading is essential, only the plumpest grains are sown. Here the cracked and shrivelled grain removed will pay well for the trouble, as it is only wasted when sown. Does anyone need convincing that it is wise to sow only plump grain? Two influences are to be noticed here, namely, inheritance and environment. As far as inheritance goes seed that is badly developed on account of adverse conditions is just as good as the plumpest grain, but not so in the case of environment. During the first period of a plant's growth it draws entirely on the food stored in the seed. is stored inside the husk, and as this portion of the shrivelled or small grain is much less than is the case in plump large grain the plant must consequently get a better start from the plump grain, and a good start is absolutely necessary under the trying conditions that our crops are usually subjected to. In fact I am rather doubtful if the plant that is stunted at the start will ever catch the other, even under the most favorable circumstances. A much better germination will also be obtained from plump seed. Twenty pounds of good seed will produce, on an average. about 200,000 grains. Allowing for 20 per cent. of failures, this means four plants for every square foot to the acre, and this is as much as most of our land will about 200,000 grains. bring to maturity. Therefore it is very evident that a large quantity of seed is being wasted. But no doubt many are of the opinion that selection is unnecessary. Why is it that certain varieties of wheat, once popular, are now seldom heard of? Take as an example Federation, one of the most, if not the most popular wheats in the Commonwealth at the present time. Numerous complaints are arising about it Why? Simply because it, with others, is being neglected. What deteriorating. Professor Perkins would become of our well-bred flocks and herds if so treated? when in Spain (the home of the Merino) secured photographs of Merinos hard to recognise as sheep. Our wheat of to-day is supposed to have originated from a seed-bearing grass in Palestine of very little food value, and little was done in the line of scientific breeding and selection until the beginning of the eighteenth century. See what it is to-day. But there is still plenty of room for improvement. Hallett, in 1857, from an ear of wheat containing 47 grains, increased the yield to 123 grains per ear in four years, and 52 ears to the plant. In a certain part of Victoria selected Federation showed an increased yield of over 9bush, over that With a few following these practices an improvement will be effected, not selected. but it will not be very marked unless the farming community as a whole can be induced to follow some such lines. When one considers that an increase of one single grain per ear would increase the yield of South Australia by half a million bushels, surely here is an easy way for the farmer to swell his profits and indirectly the wealth of the State. Hallett increased the yield 76 grains per ear. Farming is yearly becoming more expensive, and unless advantage is taken of such oppor-tunities as these, I am afraid that the outgoings will soon be larger than the re-Grading alone is a very good thing as far as it goes. On an experimental farm in Victoria graded seed showed an increased yield of 21bush, against that not The idea that a change of seed from another part is an advantage has If wheat comes into climatic conditions differing been proved to be utterly false. from those in which it has been bred, it stands to reason that it must be at a disadvantage until it becomes accustomed to those conditions. Professor G. W. Shaw, of the University of California, conducted thorough experiments on this question on four stations under his charge. Varieties grown on the different stations were sent to various parts of the State and grown for some time; then seed was taken from them and grown alongside seed that had been grown continuously in the one place, and in every instance the "fold" seed gave greater returns than that which had had the change of conditions. Wheat can be grown continuously without deteriorating. For instance, King's Early has been grown at Roseworthy College from the same strain continuously for the last 20 odd years, and the average yield for the last eight years has been 20 bush., and we all know that the last three years have been exceptionally bad grain years. I have striven to convince members that it is profitable to select; now for the method. To get a thoroughly even strain one must start from one plant, for as there are many different types of Merino sheep, all pure-bred, so there are many different types of plants in every variety. The first thing to decide on is the variety; select one suitable to local conditions. The next is the fixing of the standard. In this there are many things that might be studied to advantage, but the chief things for the farmer to consider is heaviness of yield and immunity from disease. To select these it is not advisable to pay too much attention to the head alone, as in a plant with, say, three heads containing 100 grains each would not be as advantageous as one with nine or 10 heads each containing 50 grains. Select a l'mited number of plants, those nearest the standard. taking care to keep them separate. Rub out the heads, grade the grain and put in separate tins or envelopes, numbering them from one upward. At seed time drill a strip in the middle of the fallow with manure only, and sow the seed by hand, not thicker than every other row, preferably thinner, taking care to leave ample room between each lot. In this way one can watch the development easily, and can detect strangers or those that have not thrown true to type; these should be pulled up. Now the thing to decide at harvest is which plot is the nearest to the standard. Having decided, hand reap and grade, then multiply as quickly as possible. Having all originated from one plant, the probability is that a good, even lot will be secured. The remainder of the plots can be added to the ordinary seed. As soon as the selected plot 's big enough, start selecting the largest heads from the best plants. This is where the tedious part comes in, as it will require about three sacks of heads to produce 1 bush. of hand graded seed, but to keep up the standard it must be

Sow this bushel by itself, and the following harvest select the heads from it, and so on indefinitely, always retaining the remainder for the next year's seed. If at any time one desires to improve the standard go through the performance again, starting, of course, from the best plants procurable. Some go so far as to advocate the one plant plots every year. Of course it must be the best, but on a farm of any size, where time is such an important factor, I do not think it advisable. I would not advise trying too many varieties for a start. After one becomes used to the method one can easily extend operations. To those that have not already done so, I would advise them to look up an address by Mr. W. J. Spafford on 'Wheat Selection,' in last April's Journal.''

HAYMAKING.—Mr. R. W. Rolland read a paper on this subject. Referring to the suitability of different varieties of wheat to different districts, he said that late sorts, such as Marshall's No. 3, Bluey, Gallant, and Tuscan, were most profitable in a wet, hills locality, and for the Adelaide Plains he advised such varieties as Indian Runner, Medeah, and Le Huguenot. The mallee country was best served by early sorts, such as Golden Drop, King's Early, and Gluyas. He then described the various stages of haymaking, expressing a personal preference for hay cut just after the flower had fallen, and when the grain was full but milky. If the land were suitable, the best machine to use for cutting was the binder. Points dealing with the method to be adopted in stack-building were then dealt with at length, emphasis being laid on the necessity for care to avoid carting the hay in too soon. Sheaved hay, he said, should remain at least a fortnight in the stooks. ready the grain should be hard, and the straw brittle at the nodes.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.). November 10th.—Present: eight members and four visitors.

HOMESTEAD MEETING .- Members foregathered at the homestead of Mr. H. Ayris (Chairman of the Branch), and inspected the property. Attention was first directed to the young fruit trees. It was noticed that the apples and pears were doing best, and also that trees that were sheltered were doing better than those in A paddock of 30 acres of Prior barley was looking very more exposed positions. well, although in places it was patchy, as if affected with take-all. The sowing of this was completed on July 10th. Further on oats, which were sown by June 5th, gave promise of a good cut of hay, especially on the ground that had been cleared for seven or eight years; this portion being much better than that along-side, which had only been cleared about three years. Forty acres of Federation wheat was at the end of the paddock, and here again the difference in the crop was very marked; the new ground looked well, while that cleared three years ago was very patchy. The sowing of the wheat was finished on July 15th. ing to the homestead the scrub roller was inspected, and later on the eucalyptus oil plant, where a good discussion took place on the best method of erecting the tanks and furnaces.

MEADOWS SOUTH (Average annual rainfall, 35.32in.).

October 19th.—Present: nine members. RABBIT INDUSTRY.—Mr. A. L. Ellis contributed a paper. He referred to the fact that whilst there was an extensive trade in rabbits at present the profit therefrom was not reaped by the person on whose property the animals were bred and fed, but by persons who were paid by the landholder to rid the land of He suggested increasing the size of the rabbit by breeding, feeding them on windfall apples, &c., and in this way turning a pest into a profit producer to the owner of the land.

MEADOWS SOUTH (Average annual rainfall, 35.52in.).

November 16th.—Present: 11 members. OCCURRENCE OF FLOODS.—In a short paper dealing with the damage done in the hills districts by floodwaters, Mr. J. Philpot mentioned that during the past year, when 39in. of rain fell between April 1st and October 1st, he had land that (1) had been ploughed, (2) land that had been ploughed and harrowed, (3) an area ploughed, harrowed, and rolled, and (4) a portion treated similarly to (3), but carrying a crop of barley about 6in. in height. The first three washed badly, but there was no trouble in this regard with the He inferred from this that it was advisable for landholders to get their

crops in very early, and if they grew too rank to feed them down with stock when the weather was favorable. In discussing the subject, Mr. W. J. Stone said it was a mistake to plough up and down hill. Mr. Nicolle advised ploughing a furrow around the cropping ground.

MOUNT BARKER (Average annual rainfall, 30.93in.).
October 20th.—Present: 21 members and 10 visitors.

FIELD TRIAL.—The meeting was held at the homestead of Messrs. Pope Bros., where a field trial of cultivators was being held. The work of the various implements was watched with interest.

MOUNT BARKER (Average annual rainfall, 30.93in.). November 17th,—Present: 34 members and three visitors.

SELECTION OF SEED WHEAT .- In an address on this subject Mr. F. Coleman (Chairman Advisory Board of Agriculture) said wheat had probably been developed from a grain-bearing grass found in Palestine. The variety most commonly cultivated in Australia (Triticum sativum vulgare) was in itself almost a perfect food, and hence the crop became the most important food production for the white races of the world. In the hotter, drier districts in the north of Africa another variety of the wheat plant, the Durum wheats, was grown. better drought resisters; rich in gluten, but poor in starch, with a sweet straw, which made them valuable as hay wheats. The wheats of Western Canada, in the United States, made a large loaf; those of Oregon, England, and Australia yielded the whitest flour; a mixture between Western Canada or Manitoban and English wheats made sweetest bread. Australian wheats were valued for the excellent color of their flour, and hence were used for blending with the stronger European varieties, the flour from which required bleaching in order to produce a good white loaf. Our wheats, however, were weak in strength, but improvements in milling appliances had induced the English millers to leave to the growers the question of varieties best suited to their conditions. For us this meant a straight grade wheat, that was one which alone would produce an excellent loaf of bread. While animals had been improved by breeding for some 2,000 years, the improvement in plants, and in wheats particularly, was only of comparatively recent date. In animals improvement had produced Shorthorn and Jersey cattle, the draught and trotting horses, and Merino and English breeds of sheep, the White Leghorn and Orpington fowls, as typical examples. Plants bred like animals, and the possibilities of improvement in varieties of wheat suited to various conditions, climate, and soil were as great as in the animal world. Hays, in America, had found the need to breed wheats for different parts of Minnesota, hence the probabilities were that different districts in South Australia might require different varieties to give the maximum returns; indeed, they had already found it so. the most popular wheat in Australia to-day, appears to be unsuitable to lighter mallee soils, where, however, such wheats as Kings, Gluyas, and Carmichael appeared to give better results. All through Nature there was an inherent tendency to vary. While an enormous majority might only vary in an infinitesimal degree from the mean of the lot, there would be a few that were distinctly better, and a few undoubtedly worse. This applied to wheat as to livestock. To maintain a few undoubtedly worse. This applied to wheat as to livestock. To maintain a high standard it was necessary to eliminate the inferior; to improve the standard they must select and breed from that strain or characteristic they wished to become fixed and permanent, hence the need for selection of the best in raising seed It was not as easy as one might imagine it to be to pick out of a paddock two wheat plants with an equal number of heads, apparently equally well grown in every particular; but if this were done, and on threshing out the grain and cleaning it they found the same number of grains to each plant, a closer examination would almost certainly show a slight difference in color, size, shape, or appearance. Selection was the surest and most powerful means of improving wheat. In Canada the yield of the crop had ranged from 39bush to 46bush. France had gained much from sowing larger seed. Cobb, of New South Wales, after testing 24 varieties, was convinced of the advantage of grading and sowing the best seed. There were grading machines on the market, but while mass selection was of advantage in the removal of cracked, broken, and immatured grains, also of weed seeds, and in this way avoided waste and helped towards a cleaner crop, yet purity of type in the crop would not thus be obtained. Little seemed to have been done

in the way of selection of wheat till a Scotch farmer, Shiereff, began work in 1819. though Virgil, the Latin poet, born 70 B.C., said that unless the larger grains were selected the wheat would degenerate. Hallett, in 1857, from an ear of wheat 43in. long, containing 47 grains, obtained in four years—that is, in 1861—a head 8‡in. long, with 123 grains in the single ear and 52 ears on the plant. At Minnesota between 1895-98 a wheat—No. 169—gave an average of 28½bush, while the unselected parent stock yielded 22½bush. per acre. In Victoria the Selected Federation had given over 43bush, per acre, compared with 34½bush, from the ordinary strain. Hallett in five years doubled the length of the head, increased the number of grains three times, and the tillering of the plant fivefold. De Vries had pointed out that we got mutations, as he called them, which bred true; from a four or five-leafed clover he obtained a six or seven-leafed clover-probably the only plant of that description ever known. Bearing in mind that tendency to variation or mutation in the wheat plant, the method adopted by Hallett in 1857 was a most effective and reliable one to adopt. That was the repeated selection, year after year, of seed grain taken from the best plant. Thus the produce from one grain sown last year was again sown this year, and in that way a stock of pure selected wheat of that variety was obtained. Starting with, say, 100 grains selected from the best plant on the farm, they would obtain from 1½lbs. to 2lbs. of seed. This, the next year, should give about 4bush., which on nearly an acre the third year would give enough to strip with the machine. It was well, however, to take 200 or 300 grain lots the first year, each, of course, from a separate plant, to insure getting the There were several points to be considered. desired strain or quality. miller and the baker aimed at color, gluten, and strength in the flour, the farmer required a prolific, rust-resistant, drought-resistant, reliable wheat to yield. It should be the aim of the grower of seed wheat to suit miller, baker, and farmer. He should select with regard to—(1) Suitability to the district; (2) yielding capacity; (3) retention of grain, yet not too tough to thresh; (4) freedom from disease; (5) resistance to drought; (6) quality of grain; (7) early maturity in drier districts; (8) stiff straw to earry the crop; (9) resistance to smut. One here and there doing that work would have an influence, but if the work of selection were carried out by a great many farmers over the State, the improvement would be marked, for an increase by selection of but one grain per head through the crop would mean an increase of half a million bushels per year over South Australia, in value about £100,000. Hallett increased from 47 grains to 123 Australia, in value about £100,000. Hallett increased from 47 grains to 123 grains. Most of the best wheats grown in South Australia had been selected from conspicuous plants in the crops, such as Dart's Imperial Marshall's No. 3, Gluyas, Carmichael's Eclipse, King's Early, Viking, Petatz Surprise, College Eclipse, Leak's Rustproof, Baroota Wonder, Steinwedel, and Correll's Le Huguenot.

MOUNT COMPASS.

November 20th.—Present: 11 members and one visitor.

Marketing Vegetables.—Consideration was given to the question of a means of marketing surplus vegetables grown on the swamp lands of the district, and a committee was appointed to go into the matter.

PORT ELLIOT (Average annual rainfall, 20.33in.). November 20th.—Present: five members.

Vegetables.—A paper on this subject was contributed by Mr. E. Say. The essentials for successful vegetable growing in this State, he said, were good rich soil, an abundance of moisture, shelter from winds, and freedom from insect and fungus pests. He mentioned that he had seen vegetable seed sown, and then left; of course the results were not satisfactory. Half the battle was to have the ground prepared thoroughly. "The potato, whilst growing in many kinds of soil," the paper continued, "to be raised to perfection, requires a soil of a deep, free loamy nature, thoroughly prepared, and the seed used should be good. Often failure has been due to nothing more or less than putting in indifferent seed. I prefer the use of whole seed, say the size of a small hen's egg, to the large seed which requires cutting. Especially is this necessary when the ground is rather dry, and seed is likely to remain some time before growing. I never plant until the potato shows signs of life, with nice healthy little shoots. Place the setts 15in. to 16in. apart in rows 2ft. to 2½ft. apart. The soil should be hoed as sooon as growth is sufficient to indicate the line of plants, and then later on, when they have attained a height of 5in. or 6in., bringing the soil this time up against the plants along the rows.

One well-known Adelaide grower told me that he always ran a light set of harrows on a field of potatoes just as they were breaking through the ground. hocing will be necessary in a few weeks' time to properly bank up the rows, especially is this necessary in the summer. Potatoes are liable to disease, one of the worst home the rotate like in the summer. worst being the potato blight, and the cause of the tubers being attacked is chiefly that the spores are washed from the leaves through the soil on to the potatoes, and if the hilling of the plants is properly carried out there would be a greater thickress of earth for the spores to pass through, resulting in the arrest of many of them, and a corresponding decrease in the amount of disease. Hilling will also save a large quantity of tubers from the attack of the potato moth in seasons when this pest is prevalent; it will be noticed that all the potatoes near the surface are affected by the grubs. There may be some land so rich that it does not require manure for some time, but I like to give the land a good coating of stable manure, plough it in, and then later on, when planting, sow along the rows the prepared potato manure. A crop of six tons of potatoes weighs about 18,000lbs. of tubers and haulms and removes from the soil 80lbs. of potash, 67lbs. nitrogen, and 24lbs. of phosphoric acid. A good mixture as manure for potatoes on average land is 2cwt. superphosphate, 1cwt. sulphate of potash, 1cwt. of sulphate of ammonia per acre. If the grower intends to save seed, the time of harvesting is the time at which to make the selection, and I contend that this is the only way he can get really good seed. He should select from the plants that have the best average lot of potatoes under them, avoiding all that show a tendency to bear a number of small ones. Potatoes for seed need not necessarily be put under shelter to be stored, as exposure to a certain amount of weather will do them no harm; in fact, they are all the better for it; under a shady tree is a suitable place. for market can either be stored in a pit outside and the heap covered with earth and straw, or carefully bagged and put under cover. The onion, in my opinion, comes next in usefulness to the potato, and like the latter, after harvesting can be stored for some considerable time. The onion, unlike most crops, does not exhaunt the soil on a considerable time. haust the soil, or require that the land should be rested at intervals, but will yield heavy crops year after year on the same land. Some of the famous onion districts of Victoria have been continuously under crop for 15 or 20 years. Of course, in the first instance, the land must be rich, and above all things, a thorough good tilth is necessary for the production of a good vegetable. Onions will stand a high degree of heat, provided, of course, it is accompanied by a certain amount of mois-The seed can be sown in the bed where it is to remain after it has been thoroughly prepared, or smaller beds can be made, and the onions transplanted when large enough to handle. If transplanted, they will root better if the top leaves are cut off an inch or so above the crown or at the part where the leaves join the main stem. Choose moist weather to move the plants, carefully avoid ground thoroughly worked and free from weeds whilst the onions are growing. Experiments have proved that there are few manures suitable for this crop, and the only addition likely to prove of any advantage is a light dressing of coarse banedust. bonedust. When the onion is ready for harvesting, which may be known by the top changing color (although some growers affirm that the onion will keep and handle better if not too ripe when taken out) it can be hand pulled. This should be done and all the done when taken out it can be hand pulled. be done on a cool day. Onions keep well. Perhaps two of the best varieties for growing would be the Early Globe and late-keeping Brown Spanish. The cauliflower and cabbage are grown largely throughout the States, and are very useful I suppose anybody can raise either of the above vegetables of a sort, but it is not every one who can grow them to perfection. The cauliflower in the first place should be raised from seed of the finest quality, and from the time it is put in the ground should not receive a check until ready for cutting. The cauliflower requires a realizable conditions of the cauliflower requires a realizable condition. flower requires a really good soil, rich in organic matter, and will do well on river It is preferable to grow the crop so that the flowers form in cool weather. With two or three days of intense heat, and even with plenty of water, a bed of cauliflowers is soon ruined. The land requires to be well prepared, and the plants kept free from weeds. kept free from weeds. Stable manure, and plenty of it, should be used for the cabbage and cauliflower, and failing this, bonedust and sulphate of potash at the rate of 3cwts. to the acre. Two or three ozs. of seed is more than sufficient to supply plants for an acre. It is a good plan when transplanting from seed bed to open ground to dip them in a mixture of kerosine emulsion or tobacco water if there is any sign of aphis. Both cabbage and cauliflower are subject to aphis and moth, and unless checked, these will do considerable harm. Spraying with kerosine emulsion is the best remedy. Good varieties of cauliflower are Veitch's Autumn Giant, Early London; Cabbage, St. John's Day (one of the best for hot climates), Succession, and London Market. To sum up, one can hardly give vegetables too much labor and attention, and what is most important, they should be given it at the right time. Virgin soil appears particularly well adapted to the growth of all vegetables, and this may be partly due to the manuring of potash which the soil receives from the clearing and burning of the timber.

STRATHALBYN (Average annual rainfall, 19.28in.).

November 16th.—Present: 16 members.

Mr. Follett gave the final of his series of papers on "Manures," dealing principally with the analysis of manures and value per unit. Mr. Cockburn gave an interesting paper on "The Heading of Wheat." The members were all in favor of heading or threshing, but it was not altogether practicable for each farmer to have a separate plant. It was thought a large travelling plant would have plenty to do in the second year, if not the first year, after adoption of the practice. The subject of bush fires was brought forward, and the serious outlook this year on account of the abundance of grass. A deputation was appointed to wait on the District Council to ask that the neighboring councils should co-operate and appoint a committee as provided for in the Bush Fires Act.

WOODSIDE (Annual average rainfall, 31.95in.)

November 17th.—Present: 10 members and one visitor.

Mr. E. E. Williams tabled three samples of Berseem which was grown on his farm at Woodside. As this is the first grown in this district, the samples speak well for the suitableness of the climatic conditions, as the samples comprised one of a month's growth, one two months', and one three months', and lengths ranged from 15in. to 3ft. A good discussion followed by members present. Mr. E. H. Lauterbach read a paper on "The Management of Poultry." He said:—"Before going into the business of raising poultry be sure and have comfortable quarters for the fowls. Plenty of dry dust for bathing should be available at all times: it is an excellent preventive measure against lice. This, with plenty of sun, plenty of pure water, and liberal feeding will ensure success. All birds require plenty of fresh air. Fowls do good when allowed to range over the farm, by killing insects. Feed should be scattered on gravel or on the chips from the wood heap, so that the birds would have to scratch for their food. When mixed feed is given it should be made as stiff as possible. In the winter warm food, such as potatoes, boiled with a little meal and onion chopped in it should be given. Broken bones, lime rubbish, and gravel should always be available. In the winter a sheep's pluck hung where the hens can reach it by jumping up to pick it piecemeal, will keep them in good laying trim, but be sure you do not overfeed with meat. If so it will show in loss of feathers and health. Poultry being fattened should be confined in a small space—the smaller be better. Two weeks should be sufficient to make them fat. They must be kept in well ventilated coops, and three times a day should be given warm feed and allowed plenty of water and gravel all the time. If instead of water their drink is skimmed milk they will become extra fat. Turkeys are very delicate as chicks. The eggs take from 30 to 32 days to hatch, and for the first four weeks the young chicks should be carefully watched. They will stand neither the hot sun, heavy rains, nor much dew, and they must be kept warm. Hard boiled eggs rubbed up with a little oatmeal or cornmeal is a good food for the first two weeks, after which light wheat and cracked corn may form the staple. About the time they acquire the red head, which is at about six weeks of age, which next to the third day is the most critical period of their life, they should have nutritious food, and if a little bruised hemp seed is added so much Give but a little feed at a time and often. Young onton tops, chopped very fine and well mixed with the food is excellent; curds of sour milk are eagerly eaten, but should not be given as a constant food. Pure cold water must always be at hand as a drink, but occasionally, say once a day, skim milk may be given. Where cornmeal is the basis of the food it should always be cooked into a hard mash before being fed."

CHERRY GARDENS.—CORRECTION—On page 437 of the November issue Mr. G. Hicks is reported to have "believed in changing the collars from one horse to another occasionally, as the practice tended to prevent sore shoulders by shifting the pressure from one part of the skin to another." Mr. Hicks' paper read, "I believe in changing the hames, putting them in different collars; it changes the draft."

CYGNET RIVER, November 24th.—The inaugural meeting of this Branch was held at the residence of Mr. N. Brennand, there being present eight members and eight visitors. The Chairman (Mr. H. A. Bauer) and Messrs. R. Wheaton (MacGillivray Branch), H. Wiadrowski, and V. Cook delivered addresses.

IRONBANK, November 21st.—In reply to an inquiry as to the reason that spraying with a mixture of 51bs. bluestone, 31bs. arsenate of lead, and 60galls. water, burnt the foliage of trees, Mr. Coats stated that the mixture was too strong, and probably the trees were treated when a hot sun was shining.

MOUNT BARKER, September 22nd.—In the presence of 39 members and five visitors the Poultry Expert (Mr. D. F. Laurie) delivered an address on "How to build up a poultry flock."

SOUTH-EAST DISTRICT.

KALANGADOO (Average annual rainfall, 33in. to 34in.).

November 13th.—Present: 10 members.

RABBIT DESTRUCTION.—This formed the subject of a paper by Mr. J. M. Mitchell (Chairman), who after referring to the excellent opportunity afforded by the shortage of feed last year for landholders to grapple with the rabbit pest, said:—"In my opinion, simultaneous destruction is carried out in the wrong season of the year. I believe in keeping at the pest during the whole of the breeding season, that is from May on till the dry weather sets in. At present the rabbits are allowed to breed, and then an attempt is made to destroy them. The methods of destruction adopted are poisoning, fumigating, trapping, digging out, and ferreting. Poisoning I have discontinued altogether on account of losses in stock, and the fact that it cannot be successfully carried out when there is green feed about. I favor trapping if carried out on proper lines, i.e., first destroying the majority of the pests, and then filling in the burrows. land is fairly clean one can fumigate or ferret the rabbits that remain; of course, if the country is netted the task will be much easier than if open, but my contention is that if every landholder did his duty the rabbit pest would be reduced to a minimum and the country would be a great deal better for it. We can see plainly what can be done by looking back over the season just passed. Owing to the high price given by the rabbit factory, the scarcity of employment, and the wet winter, rabbits are very scarce. I might say—in conclusion that a great many landholders carry out vermin destruction in a half-hearted way to avoid prosecution, and in the majority of cases the man with the small they would do their utmost for their own good, for it is very evident that where rabbits are numerous stock get a bad time. It is only by united efforts and constant attention on the part of the landholders that the rabbits will be kept in check, and I earnestly urge everyone to give this matter very serious attention. Mr. Riddoch had found poisoning very effective, especially in the dry seasons, at a much less expense than trapping. He had also been very successful with the fumigator, and advised landholders to wire-net their holdings as soon as possible. The only drawback he had found with poisoning in this district was the growth of green grass during the summer months. He had not had any great loss of stock through the animals picking up the baits. Mr. Bennett thought the poisoning was very effective, especially if all landholders would destroy at the same time and dig out the burrows to kill the young ones. Some members thought a number of stock were poisoned by eating the poisoned rabbits. Mr. Rogers said some thought a beast would contract compaction through eating the rabbits;

although the poison might have been exhausted it might be caused by the dry fur. Mr. Gardiner said steaming had not proved so successful on Koorine as fumigating, which had cleared out the rabbits where they were very bad at a cost of about 2s. per acre. Mr. Haines favored trapping and filling in the burrows as the best means of getting rid of the pest. On a vote it was decided that the most effective means of combating the pest in this particular district were to wire-net the holdings, poison, fumigate, and fill in the burrows.

KYBYBOLITE (Average annual rainfall, 22in.). October 21st.—Present: eight members.

SIDELINES ON THE FARM.—In a paper with this title, Mr. E. W. Duffield urged farmers to combine with wheat-growing the keeping and raising of live stock. A flock of breeding ewes would help to keep the land clean, and supply lambs for marketing. He recommended Merino ewes crossed with Lincoln rams. Summer feed, such as peas or rape, should be grown for the sheep. A few cows, if they produced a good average quantity of butter, would be found a good source of revenue. Summer green feed should be provided for them, and they should calve about the end of April, when plenty of green feed was available, and high prices for butter prevailed. Pig-raising could be combined with dairying to advantage, and if systematically conducted would prove very profitable. Poultry should also be kept, and it should be the endeavor of every farmer to raise every year two or three draught foals, in order to maintain the strength of the teams, and possibly some could be sold. A kitchen garden should also be provided to supply all vegetables necessary for the household. If more attention were given to such sidelines, farming life would become more attractive and more remunerative.

MOUNT GAMBIER (Average annual rainfall, 32in.). November 13th.—Present: 19 members.

Mr. E. F. R. Schlegel exhibited some fine New Zealand Western Wolth ryc

grass. It was quite 4ft. high, and was planted at the end of May. LIME AS A FERTILISER.—Mr. J. Davidson read the following paper on "Lime as a Fertiliser'':--"Failing a more interesting subject the following observations on the uses of lime are presented. I do not pose as having actual experience of the matter in hand—the information is gathered from noting the results of the applications of lime on New Zealand soils, and this paper chiefly consists of notes from the official records of the Agricultural Departments of Victoria and New Zealand, embodying the findings of farmers and others. The study of lime has been before you on several occasions, and the day is not far distant when lime will be used extensively in the South-East, as the use of crushed lime is steadily gaining attention among experienced farmers. I have in mind a large area of land in the South Island of New Zealand that was originally covered with a heavy snowgrass, similar to the tall tussocks on Millicent and Rendelsham country. This land was sour, cold, and unfertile, the mass of fibrous roots of the native vegetation was tough enough to make farming very unpopular. This same land has been transformed with lime and cultivation. The remarkable effect of the liming is the speedy decay of the peat and roots, and making available the soil constituents for plant food. Instead of requiring five years for the turf to decay properly, two years suffices; this is the opinion and experience of many farmers. The land referred to now produces capital crops of English grasses on which are raised thousands of lambs for export. It is pretty certain the same excellent results could be obtained on the turfy and peaty land in the lower South-East. The free carriage of lime up to 100 miles by the New Zealand railways has been justified by increased production. During 20 years' trial they feel warranted in saying that where a truck load of lime goes an extra truck of produce is returned. When 110 bush. and 120bush, per acre of oats is reaped, as recorded last year, liming sour land does its The Agricultural Superintendent, Victoria, said:—'That lime returned a net profit of 66 per cent. after paving outlay, and the following crop was much Lime will not give good results on land which is too poor in available Where lime is used phosphate should be used as usual. phosphoric acid. Victoria lime will seldom fail to act because of a deficiency of potash. We find that on stiff clay soils, peaty lands and reclaimed swamps burnt lime is most efficacious. On other soils unburnt or ground limestone rock will give more beneficial and lasting results.' Frequently we hear farmers speculating on the question,

An authority replies:- 'The nature of vegetation when does a soil need lime? often indicates whether lime is wanting or abundant in a given soil. The habitual presence in the crops of such weeds as sorrel, docks and plantain, which are acid-loving plants, is an indication of the lack of lime, just as the continual appearance of vigorous clovers and sweet grasses is a sign of a sufficiency of lime.' I believe there are some special paddocks of docks and sorrell in the Mount Gambier district on which might be tried the anti-acid effect of lime. A scientist claims the following points for lime: -(1) It is of the greatest benefit to all soils, and injurious to (2) Lime is good for burning up and destroying the excess of vegetable matter, as in the case of swampy land. (3) Lime sweetens the sour land by neutralising the free acids which it contains. (4) Lime in slacking imparts a great amount of heat, and rapidly warms a cold soil. I will conclude by quoting from the experience of the manager of an agricultural station in New Zealand—the pioneers of lime on a large scale. Last year he limed over 1,000 acres. He says:—
'The soil is a light loam, with a sandy clay subsoil. It yielded good crops in the first years, but soon became exhausted and turned to sorrel. The grass was also peor for stock, in fact, we could not make it pay. Liming has changed all this. We get heavy crops of oats now at least a fortnight earlier than before. Our We also grow 30bush. to turnip crops never fail, and average 25 tons to the acre. 40bush, of wheat now, which we did not attempt before liming. Our yield of oats has increased by 20bush. per acre, that is, where we got 40bush. to 50 bush., we now reap 60bush. to 80bush. We had a 180 acre paddock last year sown with rape, turnips, and Indian grass—simply a catch crop; 90 acres fattened 3,000 lambs after weaning, besides carrying 2,000 steers for six weeks. The other 90 acres carried This record of the land 350 bullocks for six weeks, and 160 dry cows for longer. was a most convincing argument-lime transformed our land from poor to rich I can only say we never made a better investment.' Another farmer says:-'Before liming, my land was red with sorrel; now you cannot find a blade. oat crops, previous to using lime, yielded 40bush. to 50bush.; now 80bush. to 100bush., and on one occasion 110bush. Turnips, before liming were poor, in fact, they could not grow for sorrel. My crops are now excellent, producing up to 25 tons per acre of Swedes. I consider my farm has doubled in value. If worth £12 to £15 formerly, it is now worth £24 per acre.' Many similar records of astonishing success could be cited, all evidently trustworthy. I do not claim any expert know-ledge of liming. These disjointed notes are given on their merits. It is believed that a large proportion of our land would respond to lime treatment, just as readily as the soils have done elsewhere." Mr. E. F. Crouch said he could bear out what Mr. Davidson had said in regard to New Zealand. The manager of the Edendale Estate, in the South Island, had a piece of land close to the railway station which It was covered with couch would carry in the spring two sheep to three acres. grass and Kentucky blue, but even this did not grow. He ploughed it, cross ploughed it, and harrowed it, and then dressed it with two tons of Milburn lime, which cost 13s. per ton after it had been railed 60 miles. The lime was put in heaps, and then spread by hand. The land was then planted with turnips, in drills, and 3cwt. of bonedust used. Afterwards 47 sheep to the acre were carried on the land for four months. Next year it was put in with oats, and some more manure used, and the result was 100bush, to the acre. The following year he took Mr. Geo. Riddoch to see it, and it was then carrying such a fine coating of grass that a bullock to the acre could be kept on it, and well. The cost of working the land had been about £5 per acre, but this money was received back in the first year. Mr. G. H. Kilsby said he did not want to discount the value of lime, but he thought the working of the land, and the knocking about it received, would They must not attribute all the benefit to the lime. Mr. Crouch had seen other lands similarly treated and manured, and they grew a magnificent crop of sorrel. The President said he understood the action of the lime was to encourage the growth of clovers and other grasses, and these crowded out the sorrel. Mr. C. T. Major said that on the block of his land on which the Government had been experimenting the dressing of lime was half a ton. It had been cultivated for seven years, and while the crop was not good this season, there was no sorrel on the land treated with lime. Mr. E. S. Alcock (inspector of experimental plots) said this was the only district in the State where superphosphate was not generally In reference to the effect of super, and the working of the land, it was the experience in other places that the richer the land the heavier the manuring it would stand and respond to. In New Zealand they used up to 15cwt. of super., and 3cwt. or 4cwt. of nitrate of soda. In a field at Lucindale they had dressed portion with two tons of lime, and the boundary of the dressing could be seen as plain as possible when looking across the paddock. Lime could not be termed a fertiliser, because it had no direct action, as with super. It had more of a mechanical action. In heavy soil it made the land more free, while in light lands it had a tendency to bind. At Roseworthy they had some claypans in which the water used to collect. The only way to treat these was with a heavy dressing of lime. This was done, and now the water could soak away.

NARACOORTE (Average annual rainfall, 22.60in.).

November 13th.—Present: 26 member and six visitors.

OIL AND PETROL ENGINES.—Mr. S. Shepherd, of the Kybybolite Branch, contributed a paper on "Oil and Petrol Engines—Their Respective Merits and Usages on the Farm." After dealing with economic factors affecting the development of the different types, the paper read:--"The advantages of oil and petrol engines over steam are many. What little the former lack in reliability is more than compensated for in their safety, convenience, and for insurance risks. the present time the comparative cost of fuel is certainly a point to be considered when purchasing a plant. It is often stated that a petrol engine will work as cheaply as an oil engine. This is not so, unless the oil engine is of poor design, as while the calorific value of kerosine and petrol are about equal, the cost of one is about double that of the other. The latest British petrol engines certainly embody some unique features. They have the massive build of the oil engine combined with the scientific design of the modern gas engine, are extremely light on fuel, and give excellent results. The limit of economy, we are told from scientific reasoning, in this type of engine is about reached. The main conditions of working are maximum volume of cylinder to minimum of surface; high piston speed, maximum expansion, maximum compression, which is limited by spontaneous combustion, correct ignition, and correct valve setting. Of the conditions stated the one most conducive to economy is compression. The explosion force equals three and a half times the compression. Therefore double the compression means double the explosion force with the same amount of fuel. Rapid expansion is another very important point, which can only be brought about by high piston speed. jacket water absorbs exactly half the fuel at its normal working speed, and any reduction of speed causes a still greater loss, as one will perhaps have noticed the rapid decline in power of an engine as the speed is reduced, due largely to the jacket water's heat absorbing influence. Then again, as the jacket water gradually rises in temperature the fuel consumption decreases, but for lubricating reasons this cannot safely exceed 150deg. Fahr. in an oil engine, but in some petrol engines it may safely reach boiling point without undue interference, especially in some of the slop-made American lines. Correct ignition is an important item in the working of an engine. Preignition seriously impairs its life, and causes violent knocks and overheating, and consequently fuel extravagance. On the other hand late ignition is wasteful, as the maximum heat is never generated, but lost through the exhaust and incomplete combustion. In many oil engines where the ignition is automatically regulated by the heat of the previous explosions it generally varies somewhat according to the speed of the engine and the flash test of the kerosine, unless the engine is adjusted to suit the different oils. It is true that some engines have timing valves, but these by no means prevent the undesirable preignition if the engine is overheated or overloaded. Most petrol engines have an adjustable sparking device, which can be set to suit varying speeds. The leading oil engines sold on this market may be divided into three classes, and the distinction between them is in the design of the vaporiser and the method of controlling the speed. There is little to choose between them from the point of view of economy, as the best types in small sizes does not exceed a thermal efficiency of 18 per cent., and up to perhaps 22 per cent in the larger sizes, which is twice as good as that of a steam engine. One can purchase an American engine on this market for about half the cost of a British, but real economy is not first cost, or doubtful low consumption. Good mechanical construction, good material, good workmanship, and good behaviour form the foundation of true economy, and quality and faithful service will be remembered when the price is long forgotten. The term horse-power is a somewhat varying quantity. The nominal horse-power is often still quoted in steam engines. The indicated horse-power means little, as it is simply a record of the pressure in the cylinder, with no allowance for friction, which is usually about 20 per cent. The brake horse-power is the power given off at the pulling, and is the only guide, and remember that the maker who is continually boasting of throwing in one or two horse-power more than other people generally throws in something cheap also, and ignores the most vital point, viz., ample dimensions. scientious maker is out to sell, and not to give away, and is not ashamed to acquaint the purchaser of his engine's measurements. One brake horse-power equals 33,000ft. pounds, and will raise 1,000galls. of water per hour approximately 100ft., and for continual running there is no power to equal the oil engine. One brake horse-power will cut 5cwt. of chaff per hour, and for driving a small thresher, a winnower, shearing machinery, a circular saw, and the general run of farm machinery, there is no better power than the petrol engine, where quick starts and short runs are needed. Judging an engine without a trial is like judging a horse. To the experienced and practised eye it is the points that count, and no maker enjoys a monopoly of all the good points, but there are a few worth noting. The crank shaft is of the greatest importance, and should be made of good material and massive to guard against fracture and wear. The main bearing pressures by far exceed that of a steam engine, and an engine builder's wisdom and integrity may be fairly well judged by his crank shaft dimensions. The balance of the crank is a problem ignored by many. There is only one effective balance, The balance of the and that is on the crank itself, and one often hears the remarks that an engine is well balanced because it has two fly wheels. The function of the fly wheel is not to balance the crank, but it is often used as a cheap method of doing so. When this is the case two fly wheels are needed, but the mechanical efficiency of the engine is somewhat reduced. The cylinder should be fitted with a loose liner of specially hard, close-grained east-iron, and should be easy to remove when necessary. The valves should be of solid forged iron, and mechanically operated. The connecting rod should be of steel, turned and polished, and should be fitted with adjustable bearings. The governor gear should be simple and effective, and belts should be avoided if possible, as a belt is never as positive as gearing, and failure may end disastrously. All gearing should be machine cut, and The purchaser is at the mercy of the maker for cams and rollers lathe turned. Therefore it is not advisable to touch an engine or firm duplicates and repairs. with a doubtful reputation. We continually hear of something new in engine design, and see scores of types of both two and four cycle engines, and it is no doubt perplexing to the average purchaser when he visits a show ground and watches the movement of a two-cycle engine with its apparent simplicity, and then turns round and watches the equally graceful movement of a four-cycle engine, with its apparent complexities. To my mind their respective merits are easily judged. two-cycle engines work fairly well for a year or so until wear takes place. The slightest leak in the rings causes difficulty of starting. They are often guilty of using a lot of petrol also, and if we look to the pioneers in the engine business it will be a difficult matter to find one of them cataloguing two-cycle engines. motor car industry has worked wonders in petrol engine construction, and again we find the four-cycle engine predominating. The care of an engine is now and find the four-cycle engine predominating. Some allow it to go to wreck and ruin. in the light that it should be by many. Some allow it to go wo with the light that it should be by many. Others again have a good engine, and because it has run for years they think it must want overhauling, when perhaps it cannot be improved upon. Never use a cheap brand of oil, because it is cheap. The engine is sure to get the blame. Some speed up far above that contemplated by the maker, involving serious problems of balance. Others again run their engine too slowly. Many engines are ruined by overloading, and many are condemned through incorrect pulleys and faulty beltings. Never use narrow belts. and avoid small pulleys. Always buy a reserve of power, and never try to break Keep the chaffcutter in thorough order, and if you should become the possessor of a good British engine you will be able with safety to say that you will have to live long to wear it out." Mr. Shepherd replied to several questions in respect to the difference between two-cycle and four-cycle engines, and the respective merits of oil and petrol engines. The oil engines had the longest life, but the petrol engines were very handy for light work on the farm. He considered that an engine of 7½ h.p. was the ideal one for a farm, for they would be able to do some threshing with it.

EXHIBITS.—Mr. Staude showed fine samples of Merino wool taken off sheep bred from Hynam ewes and Nalpa rams, and from Yallum sheep. The samples were

much admired. Mr. W. W. Gould showed a sample of the weed known as "Salvation Jane," which was plentiful in the north of the State this year, but was not to be seen much about the Naracoorte district. Mr. Loller inquired the best way of getting rid of poppies, which were very plentiful this year. The Chairman said the best way was to fallow the land, and Mr. Donohue said an effective way was to pull them up and burn them. Mr. W. W. Gould showed stalks of malting barley with two and three heads on them.

FIRE BREAKS.—Mr. Wray spoke on the necessity of landholders being careful about fires this year seeing there was so much grass about, and the necessity for

every farmer having fire breaks.

NARACOORTE (Average annual rainfall, 22.60in.). November 26th.

EXPERIMENTAL PLOTS.—Members visited the farm of the Chairman (Mr. S. H. Schinckel) for the purpose of inspecting the demonstration plots being conducted by Mr. Schinckel on behalf of the Branch. The plots were each two acres in area, and were sown respectively with Federation, Budd's, Bayah, Marshall's No. 3, Lott's, and Yandilla King varieties of wheat. Federation looked somewhat weakly compared with the other varieties, but was estimated to yield 15bush. per acre. Budd's was well grown, well headed, and should yield 25bush, per acre. was also well grown, but on examination was found to be very badly affected with red rust, and it was therefore difficult to estimate what it would return. been free from rust it undoubtedly would have yielded 30bush. per acre. Marshall's No. 3 was fairly well grown, but not well headed, and was likely to yield 30 bush. per acre. Yandilla King looked well, and provided it filled out should yield 30 bush. All the plots showed slight signs of red rust, but only Bayah was badly per acre. affected on the day of inspection. The field in which the plots were grown was under cultivation last year with peas, oats, and wheat, and owing to the drought The field was ploughed in March, harrowed and cultivated were all fed off. shortly after the first good rains, and again cultivated just previous to sowing. plots were sown on June 4th and 5th with 80lbs. of 36/38 super. per acre and 50lbs. of seed per acre. The next field inspected was behind the outbuildings, and contained 16 acres of wheat. It was the third year in succession this field had been cropped. This was the only field that was dry sown, being planted with the Federation variety and grazed with sheep to the first week in September. Though somewhat dirty with clover and melilot, it should yield from 12bush. to 15bush. per acre. The visitors then came to a field of 40 acres, 30 acres being sown with Marshall's Portions of this crop were badly affected with "takeall," but it should return 15bush. per acre. The balance of the field—10 acres—was sown with oats, and looked like cutting 1½ to 2 tons per acre. Then two acres of peas were observed, and they promised a fair return. In addition to the foregoing Mr. Schinckel had under cultivation 67 acres of Yandilla King wheat, which promised 15bush. to the acre; 62 acres of Federation, which should yield 15bush. to the acre, if not affected by red rust; 35 acres of oats intended for grain, which should yield 30bush. to the acre; and 18 acres of barley, which promised a return of 20bush. per acre. Attenton was also paid to the orchard, vegetable garden, and engine, after which the visitors were entertained at tea.

NARACOORTE (Average annual rainfall, 22.60in.). December 11th.—Present: 18 members and one visitor.

Wattle Growing.—A paper on this subject was contributed by Mr. A. B. Feuerheerdt. He said:—"The acacia or wattle family is a very numerous one, found throughout Australia and many other parts of the globe, and species are to be found which thrive in almost any soil or conditions, but there are some varieties in particular which will thrive in various soils and conditions to be found in the South-East, and these soils which are producing little or no revenue at the present day could, by the sowing of wattles, be made to return handsome dividends. The sandy fern ridges and light scrub lands so common throughout the South-East are generally looked upon as being almost worthless lands, and valued at anything between 2s. 6d. and 7s. 6d. per acre. These despised lands, if put under wattles, would return a very much greater profit than wheat grown upon land valued at £6 or £7 an acre, and with wheat at a selling basis of 5s. f.o.b. I strongly recommend anyone possessing any poor waste land to lose no time in sowing it with wattles.

Not only will they have an additional income to look forward to, but this will also ensure a permanent supply of good firewood. But it is erroneous to think that the wattles will thrive on any scrub land; that class of land, for instance, upon which is found growing stunted stringybark and Banksia ornata, commonly called bastard honeysuckle, will not grow wattles, the ideal land being those ferny frontage ridges, and the more open scrub lands growing yaccas, hill gums, and the taller For general sowing Acacia pycnantha, generally known variety of stringybark. as the golden or broad-leaved wattle, is the best. It is of rapid growth, and rich in tannic acid, yielding 30 per cent. This wattle is generally grown on all hilly, sandy and scrub country, but it does not succeed in the cold, frosty hollows. two other varieties best suited to our conditions are Acacia mollissima and Acacia dealbata, both feather or fern leaved trees of very rapid growth, which develop into large trees, attaining a height of 30ft. to 40ft., with a stem diameter of 18in., and both ideal shade and shelter trees. The former is one of the richest in tannic acid, yielding 31 per cent., the latter yielding 22 per cent. Acacia mollissima is indigenous to the South-East, and may be found growing from Naracoorte to the Glenelg. This species requires rather better conditions than Acacia pycnantha, and thrives on the warm, sandy ridges with clay subsoil or sandy loams. A single specimen of this tree has been known to yield 5cwt. of dry bark. For the cold. frosty hollows Acacia dealbata is the most suitable. It will resist any frost, and thrives on those patches where Acacia pycnantha fails to establish itself. mollissima and Acacia dcalbata are very closely allied, and may be distinguished most readily by the flowering period and ripening of its seed. Acacia mollissima flowers in the late spring, and the seed does not ripen until about 14 months later, whereas Acacia dealbata flowers most profusely in early spring, and ripens its seed This tree is an ornamental specimen, and can hardly be exa few months later. celled, and in my opinion far excels Acacia baileyanna in form and beauty. best method of treating the seed is to boil it for a minute, no longer or no less. This will give the highest percentage of germination. It is best to have a caldron or drum on the fire, three parts filled with boiling water. Place the seed in a sugar bag (say 10lbs. of seed), sufficient to sow 10 acres, and hang the bag in the When it comes to boil again, time it, and remove the seed when it has The seed may then be laid out and dried, when it will be boiled for the minute. ready for sowing. The idea of this treatment is to destroy the waterproof coating which covers the seed, and unless this is done some of the seed will remain in the ground 20 years before germination takes place. One pound of Acacia pycnantha seed is quite sufficient to sow an acre; if every seed grew one would have something like 30,000 trees. Of course, far too many, but as the seed is not expensive, one can allow for contingencies, such as rabbits, frosts, and scorching off by the heat of the sun in its early stages of growth. As all wattles in their young life are somewhat tender and are shade loving, it is obvious that the land should not be cleared of undergrowth or burnt prior to sowing. Leave it in its natural state, for the undergrowth protects the young seedlings, not only from the frost and hot sun, but also from the rabbits, for when a young plant is growing in a clear space it becomes conspicuous, and a rabbit is sure to nip it off. When collecting seed, select the best trees, leave all poorly-grown and thin-barked trees severely alone; they are invariably the heaviest seeders (a provision of Nature) for there is no doubt in buying seed it is that which has been most readily collected. Breed only from the best, and the result will be the same, whether animal or vegetable. The handiest means of collecting seed is to place a sheet in the body of a spring cart and drive alongside the tree, stripping the seed into the cart. It can be then carted home and placed upon a floor in a dry place and threshed and cleaned at will. The early autumn is the best time to sow, the young plants then become well estab-The seed should be drilled in to a depth of lished before the hot weather sets in. from an inch to an inch and a half, and the rows about 12ft. apart. A hoe taken from an ordinary seed drill and attached to the axle of a light spring cart, and a piece of flexible hosing to conduct the seed into the hoe will serve the purpose very well for a small plantation say of 50 acres to 100 acres; but when larger areas are sown an automatic sower attached to an I.X.L. poison cart makes a good implement, and with this a lad or man is able to sow from 15 acres to 20 acres a day. A machine of this description is used at Crower, and has successfully sown some thousands of acres. There is no necessity for clearing the land of logs or fallen timber, simply pass round them and come back on to the row. When the young plants are well advanced, say in the third or fourth year, they should be thinned

out to about 1,500 to 2,000 for Acacia pycnantha, and 400 for the other two larger growing varieties, for, if allowed to grow too thickly they will run up into whip sticks, and never develop into good trees. This applies particularly to Acacia In the sixth or seventh year they may be pruned to advantage by repycnantha. moving the lower limbs, as these all die off before the tree is fit to strip. tion of the trees should be ready to strip from the seventh to eighth year. the bark begins to open and crack at the base they may be safely termed fit to Where they are growing too thickly they may be thinned out and stripped before, but the bark is not so rich in tannic acid in an immature tree. they are cleanly stripped and the bark well torn out from the base, for this is the richest and heaviest bark. They will only strip and run when the sap is flowing. The work should start about August, and continue to the end of the year. Should it be a moist season the stripping period can be extended. Stripped trees should not be left standing, for they chafe and injure young trees growing beside them. They are better cut down, the limbs being trimmed off, and during the winter months they may be carted in to the wood heap. The ruling rate paid for stripping is £2 per ton, and I have known a man to strip a ton a day in good trees. bark should be stripped one day and tied or bundled the next. If tied too soon it is apt to become mouldy, and that detracts considerably from its value. The bundles should not average more than 30 to the ton, and should be stacked in rows upon rails and brush so as not to come in contact with the ground, with wattles must not be grazed before the trees are 4ft. or 5ft. high. Land sown light grazing with sheep will not harm, but cattle must be kept off at all times, for they will horn and break down the young trees. But on the class of land upon which I recommend the sowing of wattles, the grazing properties are so small that one can well afford to keep all stock off for a given period. It is useless to plant wattles unless some provision is made to protect them from fire. Where there are isolated plantations adjoining scrub country there is always a greater risk, as owners of such country must burn, and are not at all particular when or where they burn their scrub nor how far it will extend, for in their case the burning of the boundary fence is the only loss that they may sustain. Where large areas are sown a fire break not less than a chain wide should be cleared and ploughed, and even that will not always stop a scrub fire coming along with a good north wind And for that reason, whenever the weather is suitable, and the scrub will burn, burn it on the far side along the fire break. It will well repay to take these precautions, as my further remarks will probably illustrate. Acacia pycnantha has been known to yield five tons of bark worth £8 a ton per acre in the seventh year after sowing. One well-known authority estimated on a low and safe basis of calculation that 100 acres purchased at £3 an acre showed a net profit of £1,000 in the seventh year, besides paying 2 per cent. upon the money spent from the day of sowing to the time of shipping, and including interest on the purchase money. In my opinion there is no industry more safe or more remunerative than the cultivation of wattles, and the Government should foster this industry, and so make use of our idle waste scrub lands. There is no industry which employs the same amount of labor for the revenue received, for just about half of the gross returns are paid by the grower for labor employed in stripping, carting, &c., and besides this there is the railage to the mills, additional labor there in handling, grinding, etc., and then the transit from there to the wharfs. Some years ago South Africa imported large quantities of wattle seed from Australia, with the result that that country can now export large quantities of bark and undersell us here in Australia." Mr. Feuerheerdt then replied to a number of questions that were asked him by members. It was necessary to boil the seed before planting. What was commonly known as the golden wattle was the best kind to grow. It had a wrinkly bark, but was not a native of this district. The seed could be scalded one day and A large quantity of wattle bark was exported from South planted the next. The black wattle was subject to scale. Another disease Africa to Australia. Grubs destroyed wattles, but among the wattle family was known as gall lumps. they only attacked old trees. The wattle did not live long, and was subject to disease when it got old. Vigorous plantations were not touched by the grub. There was no danger of grubs attacking young trees. The average cost of sowing There was no danger of grubs attacking young trees. was 2s. per acre.

EXHIBITS.—Mr. Wray exhibited specimens of canary grass (*Phalaris*) growing on the Dyne Swamp. He also showed specimens of Italian rye grass and North of

Ireland rye grass grown on his farm.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Conferences.

The dates on which the conferences of the Agricultural Bureau of the various Northern districts are to be held have now been fixed, and arrangements are well in hand. The Mid-Northern district conference is to be held at Gladstone on Wednesday, February 16th; the Lower Northern at Gawler, on Friday, March 10th; and the Northern Yorke Peninsula conference at Kadina, on Thursday, March 16th. As usual, at each gathering addresses will be delivered by officers of the Department of Agriculture, and papers read by the members of different Branches.

Blindness in Sheep.

On several occasions during the past three months attention has been directed by correspondents to the occurrence of blindness in sheep. The symptoms were the formation of a scum over the eyes, which were inflamed, and the animals wandered about, and rushed when hustled. In one case at least, both station and home-bred sheep were affected.

The Veterinary Lecturer says the blindness is only a local symptom of a constitutional disease brought about by small parasites, which break up the red blood cells and cause anemia, of which the scum, &c., is a prominent symptom.

Treatment consists in blowing a little of a mixture of one part carbonate of ammonia and seven parts of boracic acid into the eyes occassionally, and as constitutional treatment giving two Cooper's tablets three days running.

A Doubtful Weed.

A plant forwarded by the Clarendon Branch of the Agricultural Bureau for identification was stated by Professor Osborne to be Eruca sativa, an introduced weed from South Europe, where it was used as a pot herb. "It is becoming common in many places in the last three years," says the Professor, "and in view of the unexpected spread of certain plants in Australia, it would be unsafe to prophecy the future of Eruca sativa. The plant is a cruciferous weed, and forms several seeds in a dehiscent pod; they are thus shed upon the ground when the pods are ripe.

"Careful cultivation, with the use of clean seed, should do much to suppress it, for I do not remember to have seen the plant except on cultivated land. It is a plant that we may expect in Australia—the

wonder is we have not heard of it before—for it occurs in Europe through the Mediterranean to Turkestan, and is fairly frequently recorded in England from the siftings of Eastern grain. Should the plant occur on other than cultivated land here (in Europe it is recorded on waste land), I would expect stock to keep it in check if they get it young, since in that condition it can be used as a salad plant. I know of no experiments on the effect of spraying."

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

APPLES FOR AUSTRALIAN TROOPS.

The Commonwealth Government has intimated that it is prepared to accept, f.o.b., for transmission to Australian soldiers on active service, gifts of apples.

Individuals or associations who are desirous of donating apples for the troops are requested to communicate with the Minister of Industry. It is to be understood, of course, that the Government cannot undertake to deliver fruit to individuals, but every effort will be made to ensure an equitable distribution of the fruit amongst the hospitals and camps in Egypt and elsewhere which can be conveniently reached. The apples will be conveyed to Egypt in a steamer leaving Port Adelaide about the middle of April.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, norticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.).

"P. H. R.," Balaklava, has cow with swellings on udders and teats, varying from size of sixpence to a shilling, and making udders lumpy.

Reply—Probably cowpox or variola. Stop the molasses for a time; give each affected cow a tablespoon of sulphur in her feed twice a day for a few days. Dress the sores with carbolated vaseline, and dust them with boracic acid after; wash with soap and water before milking, and milk affected cows last, as the disease is carried by the milkers' hands, which may also become affected. It is not serious, but trouble-some.

"R. O. R.," Talia, has a draught colt 15 months old, which from two months has not walked well in front, bringing about deformity of hoofs.

Reply—No, it is not corns or founder, but rickets, arising from a lack of phosphates in food with other food constituents called vitamines. Slight improvement may yet take place, but a complete cure can hardly be hoped for. If good natural pasturage is available, it will be best for him, and failing that, long hay, bran, and chaff. Twice a day in the feed a handful of bonemeal should be mixed, and a couple of tablespoons of syrup of phosphate of iron for a month or so. The hoofs should be trimmed level and dressed once a week with Stockholm tar. Do not be afraid of the grain in the chaff; it will not hurt him.

"F. B.," Hilltown, reports the loss of frog of two-year-old filly. discharge of matter, unable to put foot to ground.

Reply—The symptoms arise from an injury, and careful search should be made for maggets in the wound; if they are there dress with turpentine; if not, poultice foot in bran for a day, then dress twice daily with spirit of iodine, followed by Stockholm tar. If the joint is injured inside the foot the lameness will be permanent.

"C. D. S.," Bierley Downs, via Port Lincoln, reports that a horse came in from paddock in good condition, was fed on new oats, worked for week in stripper, then fell ill, and has been so for a month or more; has had saltpetre without relief. Stretches out, tries to pass water, and bites near flank; crouches, turns round, lies down, rolls; eats and drinks very little.

Reply—Change of work and feed induced acute indigestion, which distended bowels weakened by blood worms, and the present symptoms arise from this. Treat as follows:—Rub belly and flanks well twice a day for 10 minutes, and three times a day give on the teeth the following dose:—Calomel 20grs., tr. nux vomica 15 drops; sulphur 20grs., sulphate of quinine 30grs., mixed with honey 20grs. Treatment will probably be required for a week, but if acute diarrhea sets in before then it must be discontinued.

"A. Bros.," Ki Ki, report a mare, seven years, stiff all over, breathing hard, does not lie down, mopes, passes small worms and small quantities of sand.

Reply—Pneumonia, probably supervening on toxins from the worms. Steam head with small quantities of eucalyptus frequently. Give a tablespoon of Fowler's solution of arsenic in feed twice a day, also 10 drops of tr. aconite in a little honey on teeth twice a day. Shelter, but plenty of air, green feed, and bran.

"H P.," Kadina, has a pony which struck back of head; loses condition, staggers, bleeds at nose, ears lop.

Reply—Probably a partial fracture of the crest of the poll or first cervical vertebra. It would be well to feed and water from manger and trough high, or lower ground in front of them. Ten drops tr. arnica morning and evening in feed would help, as would also dressing the top of the poll with a lotion of tr. arnica loz., methylated spirit 1 pint.

"W. J. M.," Mindarie, has a horse with colic and water troubles.

Reply—There is little doubt but that the blood vessels and muscles of the bowels are at fault. Give 15 drops of veratrum three times a day for a few days, and the same quantity of nux twice a day for a week or so. Feed on sloppy bran only, and rub belly and flanks well several times a day.

"S. C. B.," Murnaba, Crystal Brook, states that a mare had difficulty in cleaning, and at present there is a catarrhal discharge.

Reply—So far the treatment has been correct, but in addition to the pulsatilla it would be well to give 10 drops of tr. merc. cor. twice daily for a week or so, and when the discharge is apparent, swab out the vagina with a warm solution of bicarbonate of soda, one dram, i.e., teaspoon to the pint. A mare conceiving at the commencement of heat will generally continue in season for the normal period, but there are numerous cases where she rapidly goes off heat on conception.

"A. J.," Clare, reports a supposed cancer in the eye of a horse.

Reply—As supposed, the growth is probably cancerous, and the eye should be removed; but it is not advisable to do so in the present heat. To keep the flies off hang a rag from the forehead band over the eye soaked in cod liver oil. Dust the eye daily with boracic powder, and evening time dress with spirit of iodine.

"M. E. W.," Wynarka, reports injury to left foreleg of cow, which has normal functions of body, but unable to rise.

Reply—The symptoms point to fracture of the humerus, though possibly there may be disease of the membrane covering the heart—pericarditis. In either case the milk would not be good for children. If it is a fracture, make her comfortable on the ground, and do not try to get her up. In the other case nothing can be done of permanent benefit. The treatment so far has been all right.

"J. D.," Pinnaroo, has a mare, four years, on good green wheat; went very stiff, and is so still, with steady loss of condition.

Reply—The symptoms point to acute indigestion, followed by laminitis. It would be well to let her stand for some hours a day in mud over her hoofs. Feed mainly on green stuff and bran, and give twice a day in feed for a fortnight a tablespoon of Fowler's solution of arsenic, also once a day in drinking water 20zs. of Epsom salts for a week.

"H. P.," Brooklyn, Wanbi, reports the loss of a yearling filly; cough, inflammation of lungs, and pleurisy, death; others affected.

Reply—The symptoms appear to be those of contagious pneumonia, and the other horses must have a spell until the symptoms have subsided. The treatment of hypo. and tar is quite correct, but they will probably do better if, in addition to this, they get twice daily on their tongues 3grs. of iodide of arsenic in 10 grains of sugar of milk. Steaming the head with a little eucalyptus and rubbing liniment into the throat will also help. A week's treatment should put them on the road to recovery, but they will have to be looked after somewhat.

"D. R. L.," Stantons, MacGillivray, Kangaroo Island, has a gelding, three years, which took heavy load, was brought home with difficulty, seemed dazed, would eat pebbles, &c., gripes, difficulty in passing water, which is cloudy and pale; ulcers on tongue.

Reply—The symptoms point to purpura hæmorrhagica, combined with blood worm aneurisms, and the outlook is not too hopeful. No work for 12 months. Continue the Condy and nux; also tr. arnica 10 drops twice daily, and after symptoms have abated a tablespoon of syrup of phosphate of iron twice daily on the tongue for a fortnight.

"H. H. V.," Brimpton Lake, has grey horse, eight years, losing condition. pasty swellings, loss of appetite, walks stiffly, passes worms.

Reply—The trouble arises from blood parasites, which the worms enable to live. So far the treatment has been quite correct, and it would be well to continue the arsenic, and also to give twice a day a teaspoon of sulphate of quinine in a little molasses on the teeth for a fortnight or three weeks. The long worms are ascarides and the little ones selevostomata.

"R. W. H.," Strathmore, Leighton, has a draught mare which cut hind leg on stone in October; wound seems healthy, but is slow in healing.

Reply—The mare is probably of a lymphatic temperament, and hence the slowness in the healing process. A dressing twice daily with spirit of iodine (1 dram iod. resub. to 1 pint meth. spirit), followed by a dusting with one part chlorinated lime to seven parts boracic acid, would probably stimulate the healing process. It would be well to give the mare a flat tablespoon of sulphur in feed once daily for a fortnight.

"P. Bros.," Mundulla, via Border Town, report blood yearling entire falling off in condition and swelling of hind fetlocks.

Reply—In such a case bleeding is not advisable, and castration should be postponed. The symptoms arise from bloodworm invasion, and it would be well to let the animal have a dessertspoonful of Fowler's solution of arsenic once daily in feed for a fortnight, then stop a fortnight, and repeat for another.

"J. H.," Tintinara, reports that lambs become blind, with inflamed eys and scum.

Reply—This condition has been frequently referred to in the *Agricultural Journal* during the last few months; it arises from a blood parasite. Local treatment consists of blowing in boracic acid or a mixture of that and carbonate of ammonia in the proportion of 1-10. Constitutional treatment is arsenic, most conveniently given in the form of Cooper's tablets.

"B. M.," Hallett, has a cow which is paralysed.

Reply—If, as suspected, there has been injury to the back, it would be better to slaughter. If, however, it is nervous derangement, then you may try 1 dram each of sulphate of iron, sulphur, sulphate of quinine, nux vomica, given in gruel three times a day, and rub the back with mustard oil daily. The cheapest plan will be to kill her.

"W. R. G.," Geranium, has a cow with injury to teat, followed by inflammation of quarter.

Reply—It would be advisable to lance and let out the matter, after having well fomented the udder with hot soapsuds. Then treat the wound with boracic acid. If there is difficulty in keeping the milk from coming through the wound, it would be well to get "new skin" from the chemist's, and paint the teat well with it occasionally.

"W. R. H.," Wallabrook, Frances, reports a mare out of condition, sluggish, swells under jaw, refuses chaff, but eats hay, and slobbers.

Reply—The age is not mentioned, but it may be presumed she is negroung, and it would be well to examine her teeth, as probably the bt molars back are pressing on the opposite jaw, or there may be oast dental irregularities that want attention. There is also a worm there in the stomach, and altogether the case is not likely to do well. worm treatment mentioned is right, but expensive; two tablest of Fowler's solution of arsenic once daily in bran and chaff wor, I be cheaper and quite as effective; a heaped teaspoonful of baking soda in the feed once a day would to some extent relieve the slobbering, too.

"H. H.," Angaston, has a gelding, 10 years, affected with weak scouring.

Reply—If he is a grey, treatment will probably be useless; the same may be said of a mealy bay. If other color, do not allow drink before work. During work it may be given little and often with the bit in the mouth. Pollard with the chaff will help. Treatment should begin with half a pint of castor oil and half a pint of raw linseed oil as a drench. After this has worked off the horse may have twice a day one dram each of prepared chalk, opium, and catechu, until the bowels are normal.

"L. W.," Goode, has a stallion, six years, which had an attack of gripes a year ago, now hangs head, refuses food, walks about aimlessly and blindly; attacks become more acute after food, which is not taken well, and jaws froth as he chews apparently nothing.

Reply—The seat of the trouble is in the stomach, which is often subject to gastric catarrh in stallions, and may at any time take on the acute and fatal form; the blindness is very symptomatic of this condition, as is also the frothing. Treatment—Nothing but light bran

mashes or green feed; three times a day, on the tongue, 15 drops tr. arsenicum for a fortnight; then for a fortnight, morning and evening, 10 drops tr. baptisia; then for the third fortnight repeat arsenicum. Regular grooming of the belly morning and evening will help. It is more than likely that if the horse recovers he will not be a good stockgetter, because the beginning of mischief of this nature is generally laid by giving exciting medicines, which wear out the lining of the stomach, without being of any use for the reason they are given.

"C. F. B.," Narrung, had a horse affected with intermittent paralysis of limbs and tongue, with convulsions and death.

Reply—The symptoms are those of acute upset of the central nervous system, brain, or its coverings (meninges), probably the latter. This may have been complicated by some poisonous fodder, such as burnt yacca or melilotus, or have resulted from an injury, such as a fall on the head or heat stroke. Probably no treatment would have been effectual, but a line that might have given relief would have been to have taken 3 quarts of blood from the neck vein, to have given a 6-dram aloes ball, and 20 drops tr. belladonna every two hours.

"L. H. L.," Peake, has a mare, nine years, which will not feed, mopes about, and falls away.

Reply—The symptoms point to the sequel of an attack of pneumonia. Treatment—Leave in paddock, but offer a little bran. Twice a day for a week or so mix a tablespoon of Easton's syrup with an equal quantity of Stockholm tar and honey, and smear on the teeth. Improvement will probably follow.

"J. H. L.," Murray Bridge, reports a stallion with passage of urine difficult, and much straining; point of penis sore and scabby.

Reply—Constantly feeding lucerne in large quantities sometimes results in gravelly sedimentation in the kidneys and bladder, but in this case the symptoms seem to point more to specific infection of the organ during copulation. Treatment—Give a flat teaspoonful of camphor in a little molasses on the teeth twice a day for a week. Obtain soloid perchloride of mercury, B. & W., from the chemist, and daily dissolve one in a pint of lukewarm water, and after cleaning the organ with soap, wash well with the solution. Do not use a met.d basin for the solution.

"A. H.," Myponga, reports a white mare with swelling under tail.

Reply—White horses are subject to a form of cancer called melanosis, and almost invariably this appears under the tail; a careful examination would probably reveal small swellings under the skin in other situations. The swelling might be removed by the knife, the after treatment being the daily application of a little powder sheep dip

(for arsenic) for a few days; but the lump is likely to recur, and treatment will not be satisfactory.

"A. H.," Myponga, has a calf, constipated, with swellings on hind fetlocks.

Reply—The symptoms point to intestinal catarrh; the swellings are scrofulous enlargements. Give 2ozs. of castor oil in a little warm milk each evening till bowels are loosened; then give five drops of tr. nux vomica on the tongue morning and evening for a fortnight, and the calf will probably be better.

"E. L. E.," Clare, seeks information relating to the value of milk thistles as horsefeed.

Reply—The writer has not much of an opinion of milk thistles as pasturage for horses, and their dietetic value is low. They are more profitable made into ensilage with grass when young.

"J.H.," Hammond, has a boar which refuses to notice a sow.

Reply—As he is fat it is likely that he is lazy, and it would do him good to let him rough it a bit if it is only one sow he rejects, but if he is alike to all, he would be more profitable dead. Often a boar will refuse to notice some certain sow and be all right with others. In such cases no drugs are required, and in any case would be harmful. It would be better to let him see her only twice a day when on heat instead of leaving her with him.

"J.W.G.M.," Mindarie, has mares with pasty swellings on arms and chest.

Reply—The cause is toxins produced by bloodworms. Light work will do no harm. Treatment.—A teaspoonful of resin and one of saltpetre in food twice a day for a few days, and two tablespoons of Fowler's solution of arsenic once a day in feed for a fortnight, stop a fortnight, and give for another.

"J.P.T.," Eden Valley, has pigs with husky cough, sluggish, loss of condition, infested with ticks.

Reply—The symptoms are those of parasitical infection, such as lung and bowel worms. It would be well to give in milk once ground castor seeds at the rate of 2oz. per large sow and ½oz. per small pig. Then make up the following mixture and give one or two tablespoons once a day in feed for a week or ten days. Powdered charcoal, sulphur, Epsom salts, sugar, of each a pound, and 4ozs. calomel. The apparent ticks are really large lice, and any good sheep dip, such as Cooper's, sprayed on once a week for three weeks will destroy lice and eggs, but care must be taken that the pigs do not drain where they are likely to root, or they will be poisoned. As the houses are infested with lice and worm eggs, it would be good policy to evacuate

them and give the pigs a summer shelter elsewhere; if they are not valuable buildings they may be burnt, or if this is not feasible, then they should be thoroughly sprayed out with boiling water and 5 per cent. carbolic acid. This should be done at least twice before the pigs return to them. After drying the pigs off it is a good plan to oil them over with red oil and sulphur—½lb. to 1gall.

"H.G.W.," Mount Gambier, has a bull with gonorrhea.

Reply—The bull should not be allowed to serve, as he is unlikely to stop his cows, and may probably infect them; in fact, in the condition he is in it would be better to make beef of him. The following ointment will relieve if applied to the inside of the sheath daily:—Camphor, 1oz.; ext. hamamelis, ½oz.; lard, 4ozs. Before commencing this it would be well to draw the penis and cauterize the sores with a nitrate of silver pencil, and once a week syringe out with perchloride of mercury solution, 1—1,000.

"R.D.G.," Port Broughton, reports a mare, five years, with lips paralysed, unable to eat, falling away.

Reply—Such paralysis is caused by bloodworm toxins, and the rest of the system often becomes involved. Treatment.—Endeavour to get mare to suck pollard or bran if she cannot eat; if she can, crushed oats with a little long green hay. Once a day for a fortnight give her two tablespoons Fowler's solution of arsenic mixed with a little molasses and smeared in the mouth. Twice a day give half a dram, a teaspoonful, of sulphate of quinine in a similar way. Treatment will have to continue for some weeks, and a further report will be esteemed.

POULTRY.

Meadows Branch of the Agricultural Bureau asks: "Why do hens lay their egg-bags."

The Poultry Expert (Mr. D. F. Laurie) replies:—Protrusion of the oviduct is due to various causes; weakness of that organ, an overlarge egg, accumulation of abdominal fat pressing on that organ. Do not overfeed the birds; feed in scratching litter to promote exercise. Give Glauber salts in the drinking water or wet mash. Dissolve 4ozs. in one pint of warm water; of this use two tablespoonfuls for each quart of drinking water, or add to each quart of water used in mixing bran and pollard mash, three times a week in warm weather.

Heat in the ewe is of short duration, one to two days, and the interval between (dioestrum) varies very considerably in different breeds, the average being 13-18 days.—Fras. Evelyn Place.

THE EQUIVALENCE OF LIVESTOCK FOODSTUFFS AND FEEDING RATIONS.

By ARTHUR J. PERKINS, Director of Agriculture.

(Continued from page 266.)

THE FRAMING OF FEEDING RATIONS ON A BASIS OF STARCH EQUIVALENCE.

It has already been stated that the system of starch equivalents renders possible, when economic conditions impel one thereto, to build up out of unfamiliar foodstuffs new feeding rations equivalent in value to those in current use. And it may perhaps be stated in this connection that it is very largely because full advantage was not taken of some such system in the 1914-15 season that wheaten hay chaff soared up to such phenomenal prices. Livestock had been fed very largely on wheaten hay chaff in the past, and it was exceedingly difficult to induce users to substitute for it other foodstuffs that were at the time both cheaper and more valuable. I propose showing here how these rations can be built up with the help of tables published in the earlier articles.

THEORETICAL STANDARDS.

The building up of novel feeding rations may be approached in two ways: (1) They may be built up on the basis of theoretical standards derived from actual feeding experiments, such as those drawn up by Kellner; or (2) they may be based on any given ration, the efficiency of which is guaranteed by one's own personal experience, or by the experience of those qualified to speak on the subject. It is evident, in this connection, that if Kellner's standards are of any value they should approximate more or less closely to the results of local expert experience. I think I can show this to be the case. I append below, in Table XVI., an abstract of Kellner's standards to the extent that they have local significance.

TABLE XVI.—Summarising Kellner's Standard Rations.

. Р	. Per Day and per 1,000lbs. Live Weight of Each Animal.		Starch Equiva- lents. lbs.	Total Dry Matter. 1bs.	Digestible Crude Protein, 1bs.		
Horses-Lig	ht work				9.2	18 to 23	1.2
" Me	dium wor	rk			11.6	21 to 26	1.6
" Hea	vy work				15.0	23 to 28	2.2
Milch Cattle	yielding	10lbs. n	nilk		7.8 to 8.3	22 to 27	1.2 to 1.6
"	46	201bs.	44		9.8 to 11.2	25 to 29	1.9 to 2.3
44	46	30lbs.		**********		27 to 33	2.6 to 3.0
46	46	401bs.	66		13.9 to 16.6	27 to 34	3.3 to 3.8

TABLE XVI.—Summarising Kellner's Standard Rations -continued.

Per day and per 1,000lbs. Live Weight of Each Animal.	Starch Equiva- lents. lbs.	Total Dry Matter. lbs.	Digestible Crude Protein. lbs.
Sheep maintenance diet	8.3	18 to 23	1.2
Sheep fattening	14.5	24 to 32	1.9
Pigs fattening—1st period	27.5	33 to 37	3.9
2nd period	26.1	28 to 33	3.3
3rd period	19.8	24 to 28	2.6

Table XVI. calls for a certain amount of explanation. In the first place, let it be noted that the requirements of animals—horses, milch cows, sheep, and pigs—are given, not in terms of individuals, but in terms of 1,000lbs. live weight. This mode of stating facts is, of course, essential to the scheme; and we may see how it operates in practice in the matter of horses. It is the local custom to subdivide the latter into light horses, light draughts, and draughts. These three classes of horses are represented on the Roseworthy Agricultural College Farm, and at my request they were carefully weighed by the Principal, who has submitted the following average figures:—

Light horses	8 horses	weighed,	averaging	1,039lbs.
Light draughts	19 horses	"	44	1,196lbs.
Draughts	33 horses	66	4.6	1.4111bs.

We may assume, therefore, light horses to average 1,000lbs., light draughts 1,200lbs., and draughts 1,400lbs. Hence, according to Table XVI., for light work light horses would require the equivalent of 9.2lbs. of starch; light draughts the equivalent of 11lbs. of starch; and draughts the equivalent of 12.9lbs. of starch. Locally horses of this type are frequently fed on wheaten hay chaff alone, and reference to Table XIII. will enable us to state the requirements of horses doing light work in terms of wheaten hay chaff. Table XIII. shows 100lbs. of wheaten hay chaff to have feeding value equivalent to 30.9lbs. of starch, hence light horses doing light work would require about 30lbs. of chaff, light draughts similarly occupied 35lbs. to 36lbs., and draughts 42lbs. to 43lbs. With the aid of Tables XIII. and XVI. complex rations may be calculated on similar lines.

It will be realised that the actual nutritive ingredients required by animals might be supplied to them in a state of maximum concentration. In this condition, however, they would not meet the general requirements of the animal organism; these essential ingredients must be diluted with a definite proportion of more or less inert matter. Hence the total amount of dry matter required in each ration has been indicated in the second column of Table XVI., and for light horses doing light work is represented by 18lbs. to 23lbs. It is advisable that the light horse's ration should, in the matter of dry matter, i.e., weight of food minus water contents as shown in Table VIII., be kept approximately within these figures. Thus $15\frac{1}{2}$ lbs. of oats would be the feeding

equivalent of 9.21bs, of starch, but make an unsatisfactory ration for a light horse because they supply only 13½lbs, of dry matter. Similarly 80lbs, of wheat straw, which is the feeding equivalent of 9.2lbs, of starch, are quite useless as a ration because of the 70 odd pounds of dry matter, mostly indigestible, of which the straw consists.

Finally, an animal doing work requires in the food digested a minimum of digestible protein to make good the waste of body proteins, which is one of the consequences of active existence. Hence the requirements in digestible crude protein are indicated in the third column of Table XVI. And the relative poverty of wheaten hay chaff in digestible protein is one of the reasons why, when fed alone, it is not an altogether satisfactory foodstuff for working horses. We have seen that in this connection, from the point of view of starch equivalence, a light horse doing light work requires about 30lbs. of chaff daily. Reference to Table XIII. shows that wheaten hay chaff contains 2-8 per cent. of digestible crude protein, which, in 30lbs., represents 0-8lbs. against 1-2lbs. indicated in Table XVI. as being minimum requirement. On the other hand, 15½lbs, of oats, which supply an insufficient quantity of dry matter, yield almost exactly the quantity of digestible protein required, whilst 80lbs, of wheaten straw, which supply a dangerously excessive quantity of dry matter, contain only 0-2lbs, of digestible protein.

These facts will serve to emphasise the necessity of supplying to livestock adequately balanced rations, in which reasonable account is taken of starch equivalence, together with the dry matter and digestible crude protein contents.

The facts and figures given hitherto, although based on direct experiments, are on the whole more or less theoretical; moreover, they have been determined under climatic conditions somewhat different from our own, and within certain specified limits climate does influence the feeding of animals. Thus the maintenance ration of an animal, i.e., the amount of food necessary to maintain it without loss of weight when in confinement and at rest, is always higher in a cold climate than in a warm one. I now propose comparing the theoretical data already indicated with feeding practice found adequate in old-established local livery stables. It seems unnecessary to add that if the practice of men of long experience can be shown to confirm these theoretical data, the latter can be accepted without misgiving by others less able to control on an exact basis the feeding of their livestock.

MESSRS. GRAVES, HILL, & Co., LTD.

The firm of Messrs. Graves, Hill, & Co. is one of considerable local repute in the matter of horseflesh. As a firm they have to see that their horses earn their livelihood, and we may take it that, whilst the firm cannot afford to see their animals falling away in condition, they are not likely, in the interest of their shareholders, to countenance costly wasteful feeding. In the circum-

stances, therefore, I think that we can rely upon the data very courteously supplied by Messrs. Graves, Hill, & Co. as representing the average requirements of horses working under local conditions.

Inter alia Messrs. Graves, Hill, & Co. state that light horses doing mail and other fast road work are supplied with the following ration:—Wheaten hay chaff, 24lbs.; bran, 2lbs.; pollard, 2lbs. In addition to the above, the horses receive twice weekly 6lbs. to 8lbs. of green lucerne or other green feed, say the equivalent of 2lbs. daily. I indicate below in Table XVII. how this ration works out.

Table XVII.—Messrs. Graves, Hill, & Co.'s Ration for Light Horses (1,000lbs.) compared with Kellner's Standards.

	Starch	Total	Digestible
	Equiva-	\mathbf{Dry}	Crude
	lents.	Matter.	Protein.
	lbs.	lbs.	lbs.
24lbs. chaff	7.4	21.6	0.7
21bs. bran	0.9	1.8	0.3
21bs. pollard	1.1	1.8	0.2
21bs. green lucerne	0.2	0.5	0.1
Total ration	9.6	$25 \cdot 7$	1.3
For light horses at Light work	9.2	18 to 23	1.2
" Medium work	11.6	21 to 26	1.6
Heavy work	15.0	23 to 28	2.2

It will be noted from data in Table XVII. that the feeding of light horses doing mail work by Messrs. Graves, Hill, & Co. is slightly better than Kellner's standards for similar horses doing light work, but not as heavy as that indicated for the same horses doing medium work. Additionally, the ration is thoroughly well balanced from the point of view of dry matter and protein. Considering the wide experience of this firm in such matters, we may accept this ration as a standard one for similar purposes.

There are times, of course, when other foodstuffs are relatively cheaper than those in the ration indicated above. I have therefore summarised below a series of other rations of equivalent feeding value.

Table XVIII.—Showing various Feeding Rations equivalent to Messrs.

Graves, Hill, & Co.'s Standard Ration for Light Horses doing Light to

Medium Work.

		Light Draughts (1,2001bs.).	
I. Wheat hay chaff	lbs. 16 4	lbs. 19 5	1bs. 22 5½
Bran	3 18	$\frac{3\frac{1}{2}}{22}$	25
Crushed oats	7	$8\frac{1}{2}$	10

TABLE XVIII.—Showing various Feeding Rations—continued.

	TABLE AVIII.—Diowing various.	e eeurny mu	tonscon un	terior.
		Light Horses (1,000lbs.). lbs.	Light Draughts (1,200lbs.). lbs.	Draughts (1,400lbs.).
III.	Wheat hay chaff Crushed barley Bran	. 5	$\frac{22}{6}$	24 7 4
IV.	Wheat hay chaff	10	$7 \\ 12 \\ 12$	8½ 14 14
V.	Wheat hay chaff Oat straw Crushed oats	3 15 10	$\frac{3\frac{1}{2}}{18}$ 12	4 21 14
VI.	Barley straw Crushed barley Bran	. 5	$\begin{array}{c} 25 \\ 6 \\ 7 \end{array}$	29 7 8½
VII.	Wheat straw Crushed maize Bran	8	$\frac{18}{9\frac{1}{2}}$ $3\frac{1}{2}$	21 11 4
VIII.	Barley straw Lucerne hay Crushed barley	6	13 7 12	$15 \\ 8\frac{1}{2} \\ 14$
IX.	Barley straw Crushed beans Crushed barley	4	22 5 7	$25 \\ 5\frac{1}{2} \\ 8\frac{1}{2}$
X.	Barley straw Crushed peas Crushed oats	4	24 5 6	$\frac{28}{5\frac{1}{2}}$
XI.	Barley straw Pea haulms Crushed barley	6	19 7 . 12	$\frac{22}{8\frac{1}{2}}$ 14
XII.	Barley straw Crushed beans Crushed maize	3	$\frac{23}{3\frac{1}{2}}$	27 4 7
XIII.	Oaten straw Lucerne hay Crushed maize	. 5	18 6 8 <u>4</u>	$\begin{array}{c} 21 \\ 7 \\ 10 \end{array}$
XIV.	Wheaten hay chaff Lucerne hay Carob bean meal	17	22 7 5	$egin{array}{c} 24 \ 8rac{1}{2} \ 5rac{1}{2} \end{array}$
XV.	Green lucerne Wheaten hay chaff Crushed barley	. 15	$\frac{28}{18}$	$\frac{32}{21}$
XVI.	Green maize Wheaten hay chaff Lucerne hay Crushed oats	. 15 . 4	$ \begin{array}{r} 30 \\ 18 \\ 5 \\ 3\frac{1}{2} \end{array} $	$\begin{array}{c} 35 \\ 21 \\ 5\frac{1}{2} \\ 4 \end{array}$
XVII.	Green barley Wheat hay chaff Pollard Crushed oats	. 16 . 3	24 19 3½ 3½	$28 \\ 22 \\ 4 \\ 4$
XVIII.	Green sorghum Wheat hay chaff Crushed peas	. 25 . 18	$30 \\ 22 \\ 3\frac{1}{2}$	35 25 4

In Table XVIII., then, will be found a series of rations equivalent in feeding value to that which experience has taught Messrs. Graves, Hill, & Co. to be

satisfactory for their own purposes; they also correspond fairly well to Kellner's standards for horses doing light to medium work. I do not wish to suggest that these alternative rations are superior to that of Messrs. Graves, Hill, & Co., which in every respect appears to me excellent. There are times, however, when the prices of foodstuffs are such that one of the alternative rations might prove relatively cheaper.

Messrs. Graves, Hill, & Co. supply the following ration to draught horses doing ordinary road and slow delivery work:—Wheaten hay chaff, 321bs.; bran, 81bs. Additionally these horses receive twice weekly 81bs. to 101bs. of green lucerne or other green feed. When draughts are doing long, heavy trips they are allowed daily an additional 41bs. to 61bs. of crushed oats. The values of these rations are indicated below in Table XIX. relatively to Kellner's standards.

Table XIX.—Showing Feeding Value of Messrs. Graves, Hill, & Co.'s Draught Rations, relatively to Kellner's Standards.

	Starch	Digestible	_
	Equiva-	Crude	Dry
·	lent.	Protein.	Matter.
	lbs.	lbs.	lbs.
Ordinary ration per 1,400lbs	13.8	2.0	36.5
Ordinary ration reduced to 1,000lbs	9.9	1.4	26.1
Heavy work ration per 1,400lbs.	16.8	2.4	40.8
Heavy work ration reduced to 1,000lbs	12.0	1.7	29.1
Kellner's standard per 1,000lbs.—			
For light work	9.2	1.2	18 to 23
For medium work	11.6	1.6	21 to 26
For heavy work	15.0	2-2	23 to 28

The data in Table XIX. show that when the rations in question are reduced to the requirements of a 1,000lb. horse, they correspond fairly closely to Kellner's standards, keeping rather below than above them. Indeed, they are open to the criticism that whilst dry matter is rather too liberally supplied, actual feeding value, as indicated by starch equivalents, is, if anything, below requirements.

TYPICAL RATIONS ON KELLNER'S STANDARDS.

For purposes of comparison I will insert here four typical rations built up exactly on Kellner's standards for horses doing respectively light, medium, and heavy work.

Table XX.—Showing four Typical Rations built up on Kellner's Standards

200100010	٠.		
,	Light Horses (1,000lbs.), lbs.	Light Draughts (1,200lbs.).	Draughts (1,400lbs.).
	100	2.00	1200
Light Work Ration— Wheaten hay chaff Bran Pollard	22 3 2	26 3½ 2½ 2½	31 4 3

TABLE	XXShowing	four	Typical	Rations	built	up	on	Kellner's
Standards.—conti: ued.								

	Light	Light	
	Draughts	Draughts	Draughts
•	(1,00 (lbs.).	1,200 lb.).	1,46(lbs.).
	lbs.	lbs.	lbs.
Medium Work Ration			
Wheaten hay chaff	20	24	28
Bran	4	5	6
Crushed oats	6	7	8
Heavy Work Rations-			
Wheaten hay chaff	20	24	28
Bran	6	7	8
Crushed maize	6	7	8
Crushed oats	2	$2\frac{1}{2}$	3
Wheaten hay chaff	20	24^{-}	28
Bran		6	7
Oats	11	13	15

Messrs. Rofe & Co.

This well-known firm of city carriers have also been good enough to supply me with details of their horse feeding. Their horses are said to be of the medium draught type, and we may assume them to weigh 1,200lbs. The firm state that their usual ration is as follows:—Wheat hay chaff, 32lbs.; bran, 5lbs.; with an additional 5lbs. of oats in the winter months. Last year, in view of the costliness of chaff, they tested the following ration with good effect:—Wheat hay chaff, 25lbs.; crushed maize, 10lbs. These two rations are compared below in Table XXI. with Kellner's standards.

Table XXI.—Comparison of Messes. Rofe & Co.'s Rations for Light Draughts with Kellner's Standards.

	Starch	Digestible	
	Equiva-	Crude	\mathbf{Dry}
	lents.	Protein.	Matter.
	lbs.	lbs.	lbs.
Ordinary ration per 1,200lbs	12.2	1.5	33.2
Ordinary ration reduced to 1,000lbs	10.2	1.3	27.7
Winter ration per 1,200lbs	15.2	1.9	37.5
Winter ration reduced to 1,000lbs	12.7	1.6	31.3
Special maize ration per 1,200lbs	15.9	1.4	31.2
Special maize ration reduced to 1,000lbs	13.3	1.2	26.0
Kellner's standards per 1,000lbs.—			
Light work	9.2	1.2	18 to 23
Medium work	11.6	1.6	21 to 26
Heavy work	15.0	$2 \cdot 2$	23 to 28

Messrs. Rofe & Co.'s ordinary ration comes somewhat between Kellner's standards for light and medium work. If anything, the amount of dry matter is inclined to be excessive. This defect can be corrected by reducing the chaff and increasing the concentrated foodstuffs proportionally. Thus the following rations, whilst of equal feeding value, are better balanced:—

	I,	lbs.	II.	lbs.	111.	lbs.
Chaff	. ,	28	Chaff	27	Chaff	25
Bran		5	Bran	5	Bran	6
Oats		2	Pollard	3	Barley	3

The winter ration, represented by an addition of 51bs. of oats to the ordinary ration, offers the same defect of exaggerating the amount of dry matter supplied. In other directions no fault can be found with it.

The special maize ration tested in 1914, represented on the whole rather heavier feeding than the normal winter ration; it was, however, short in protein, whilst the dry matter was reduced to suitable normal proportions. Had bran been available, this ration might have been improved as follows:—

Equivalent to Ordinary Ration.		Equivalent to Winter Ration.		
Cnaff	251bs.	Chaff	251bs.	
Bran	31bs.	Bran	4lbs.	
Maize	4lbs.	Maize	71bs.	

MESSRS. GAMBLING & McDonald.

This well-known firm of city carriers were also good enough to supply me with data relative to the feeding of their horses. They state that previous to last year's drought they had always felt that the horses earned the money of their owners, and were in consequence never stinted in their requirements; hence their margers were always full. The firm add that last year's high prices taught them that it is better to feed horses at regular periods, and induce them to look forward to their meals, rather than to supply them with unlimited quantities of feed. They have adopted the following rations for draughts that may be taken to weigh 1,400lbs.:—Chaff, 40lbs.; bran, $5\frac{1}{2}$ lbs. This ration is shown below in Table XXII. comparatively with Kellner's standards.

Table XXII.—Comparison of Messrs. Gambling & McDonald's Ration for Draught Horses with Kellner's Standards.

Ordinary ration per 1,400lbs	Starch Equiva- lents. 1bs. 14.9	Digestible Crude Protein. 1bs. 1·8	Dry Matter. 1bs. 40.8
Ordinary ration reduced to 1,000lbs. Kellner's standards per 1,000lbs.—		1.3	29-1
Light work	9.2	1.2	18 to 23
Medium work	11.6	1.6	21 to 26
Heavy work	15.0	$2 \cdot 2$	23 to 28

Of the above ration it may be said that it supplies too great a bulk of dry matter and not enough protein. It could be modified with advantage by reducing the chaff and increasing the allowance of more concentrated food-stuffs.

(To be continued.)

THE CROSS-FERTILISATION OF WHEATS.

By W. J. SPAFFORD, Superintendent of Experimental Work.

(Continued from page 375.)

HARVESTING THE CROSS-FERTILISED HEADS.

When the heads that have been artificially cross-fertilised are ripe, they should be picked separately and each put in an envelope with the label that was attached to it; the heads still enveloped in wool are ripe enough to pick when the remainder of the heads on the plant are visibly mature.

The grains from these heads are carefully separated at a convenient time and again put in packets, tins, or some suitable receptacle to be kept until seeding time, care being taken that only the grains from one head go in each packet.

NAMING EACH CROSS.

It is essential that each crossbred grain produced should have a name for the sake of complete records of its pedigree. This is recognised as necessary with livestock breeding; and with plants it is even more so, because a man with a small stud of animals can possibly remember the breeding of all the individuals produced during his lifetime, but with plants this is impossible, as they reproduce themselves so very rapidly and take at least five years from fertilisation before there is any chance of proving their usefulness. A simple way of naming crossbred wheats is to use letters of the alphabet for each cross made, as A, B, to Z, then AA, AB, to AZ, then BA, BB, to BZ, and so on; this method of designating the crosses leaves us with the figures to specify individuals of the cross, as well as the different strains and sports that may appear. For instance, we might cross-fertilise a head of Federation with Yandilla King, we pick the head when ripe, rub out the grains, put them in a packet, and call the cross A. If there are eight grains, when we come to plant them at seeding time we call them A1, A2, A3, A4, A5, A6, A7, and A8. Perhaps one of these, A4, gives us a very promising wheat in five or six years' time, and to know its history all we have to do is to look up the record book and trace it right back to the original A4 grain.

Some Reasons for the following Precautions in Handling.

Special precautions in handling crossbred wheats for the first few years of their lives is quite essential because of the numerous types of wheats which

appear in all cases where successful crosses are effected. A good number of the characters that go to make up these various types more or less closely follow fixed laws, and the method of handling to be pointed out later is followed with the object of simplifying the "fixing" of some of these types and reducing the time and trouble of producing new wheats. That there are difficulties in fixing types can be seen by noting some of the things that do happen when certain characters are crossed with others. One law of breeding (Mendel's law) states that for characters affected by it, there are directly opposite characters, which, when crossed one with the other, react in such a way that one character is dominant to the other (this latter being spoken of as being a recessive character); and further, in the first generation of a cross the dominant characters are the only ones visible, the recessive characters being hidden for the time being. For instance, the absence of beard on a wheat is a dominant character to its presence; so that when a beardless and a bearded wheat are crossed together the first generation plants are always beardless (dominant), whether the beardless plant was female or male parent. This is only one character affected by this law of dominance, but it is sufficient to show that if the female parent of the cross has many dominant characters it is practically impossible to tell if the first generation plants of a supposed cross are naturally fertilised or not.

This law goes on to say that in the second generation, where crossbreds of the same breeding are bred together—as is always the case with wheats, because the flowers are hermaphrodite, i.e., have both male and female organs in each flower—the dominant and recessive characters separate in some instances, and in others remain mixed. In the cross instanced—one parent beardless and the other bearded—some of the plants of the second generation will be bearded and some beardless.

Of these the bearded will be true recessives, and if grains from these is planted the resulting plants will always be bearded; whilst some of the beardless plants will be true dominants (and if grain from these is planted the resulting plants will always be beardless), and others of these beardless plants will be mixed dominants, and the plants resulting from their grain will be some bearded, others beardless. As these true dominants and mixed dominants are alike, as far as want of beard is concerned, the difficulty of separating the "true" from the "mixed" will at once be recognised.

These facts, that recessives will for all time produce recessives; pure dominants will always produce dominants and mixed dominants produce pure dominants, mixed dominants and pure recessives, where they only apply to one set of characters, are simple enough to understand, but where all the characters that are affected by this law are working in conjunction a rather complex problem results.

In this connection Professor R. H. Biffen, of Cambridge, gives the following characters of wheat that are affected by this law:—

Dominant.

Recessive.

Beardless earsBearded earsWoolly glumesSmooth glumesKeeled glumesRounded GlumesLax earsCompact earsRed chaffWhite chaffRed grainWhite grain

Thick and hollow stem Thin and solid stem
Rough leaf surface Smooth leaf surface
Bristles on stem Smooth stem

Flinty grain Floury grain

Susceptibility to yellow rust Immunity to yellow rust.

Such a list of characters all working at the one time in the same manner as that instanced for beard of wheats looks a very formidable problem to work out: on paper it is so; in the field it is not so difficult, although in a great number of instances it will take a long time to obtain what one is after. If all crossbreds are worked on the following plan some chance of success should be possible to all.

SEEDING FIRST GENERATION.

The crosses made have been named and the grains separated from the chaff; these grains should be planted in a single row, or in rows quite 30in. apart, and each grain should be 1ft. from the next in the rows, and as soon as sown should be pegged with its name A1, A2, B1, &c. No special treatment of the soil before sowing is necessary, and excessive fertilising will do no good; but once the plants have germinated they should be kept quite free from weeds, and, if possible, the soil kept nice and loose. The planting should be done in the middle of a crop, or if near the homestead under wire netting; this is quite necessary to safeguard the plants from the attacks of birds.

HARVESTING FIRST GENERATION.

As has been already pointed out, first generation plants do not in many instances show whether they are crossbreds or not, so it is absolutely necessary to continue all plants, whether well grown and promising or not, into the second generation. There is generally not much trouble in the direction of not having promising plants to continue another year, because practically always the crossbred plants in the first generation are very much better than either parent, and so most beginners are very keen to go on with them.

In harvesting these plants you must remember that it is in the second generation that the different types appear, and that naturally the more grains you sow the more chance you have of getting all the possible types of a given cross. If you only have a few crossbred plants to continue, all the

grains—large, small, and even shrivelled—should be planted next year. This takes up a lot of space and time if there are a number of plants to handle, and the next best thing is to plant all of the grains of a given number of heads—1, 2, 3, &c., according to the number of plants. If you decide on two heads, the best two from each plant should be picked as soon as ripe and put in a packet with the name of the cross on the outside; these should be threshed at a convenient time, and the grains from each plant kept quite separate from each other. This keeping each plant separate from the others, even of the same cross, is quite necessary, as they are all only "supposed" crosses, and it is not until next year that they can be proved.

SEEDING SECOND GENERATION.

The grains from the first generation plants should be sown in rows at least 30in. apart, and the grains about 8in. apart in the rows. This is necessary so that weeds can be kept down and so that every plant can be seen individually. The best plan is to give every plant one row; it makes a very lop-sided plot, as the grains from the two-heads might vary from 50 grains to 160 grains, but it is only in the looks that it is wrong, as it has every other advantage. The grains sown from each plant should have a label at the end of the row.

DISTINGUISHING CROSSES.

As has already been stated, it is in this generation that the plants split up into their various types, and the first thing to do when these are ripe is to go over each row and decide whether it is a cross or not. If one of the parents had any marked characters that the other did not, and the two characters do not appear on different plants in this generation, that particular row can be ignored, for it is not a cross. For instance, if Federation was crossed by Yandilla King the plants of the first generation would be brownish like Federation, but in this second generation there will be some brownish wheats and some white ones.

HARVESTING SECOND GENERATION.

Having decided on what rows are crossbreds, the next thing is the choice of plants to continue into the third generation. It is manifestly impossible to continue all the types that appear except on a very small scale, so that for practical results a few plants of each cross likely to be useful is all that can possibly be handled. As recessive characters always reproduce themselves you might find some plants carrying a number of these characters that fits in with a type you are after. For instance, you might get a well-developed plant with compact ears, white chaff, white grains, and floury grain. If the grains of this are sown the resulting plants will all have these several characters; but in any case you will choose plants likely to be useful crop producers, and with these, when dry ripe, the heads should be cut off into

a tin with a label showing its name. The best heads of these should be threshed and cleaned ready for next seeding. It is often the case that you can get more than one very promising plant from the one cross, whereas others of the same breeding have produced nothing likely to be profitable. These should be kept separate, and their labels will show 1 A4 and 2 A4, as the case may be-

SEEDING THIRD GENERATION

The grains from these single plants should be again sown in single rows, but in this case they can all be reduced to the length of the row from the plant that has the smallest amount of seed.

In the sowing of these plots of the different generations no pampering other than the keeping of the plots free from weeds is necessary, nor indeed advisable. Too much good treatment of plants widely spaced tends to strong rank growth, and where quality of grain is one of the main characters to be recognised, rank growth is not wanted.

FIXING TYPES.

The third generation plants will show whether the various crosses are likely to produce any useful wheats, and if so it becomes necessary to "fix" these types. It is just possible that some of the rows have all the plants of exactly the same type as far as all the visible characters are concerned; if so, this whole row can be harvested with the stripper, cleaned and sown in the field next seeding. It is more likely, however, that these third generation plots will separate again into different types, possibly two types or perhaps many. Having decided that a given type amongst these mixtures is possibly a useful one, it becomes necessary to "fix" it before testing it in the field on a large scale. To do this pick only one head from each plant of the type you are after; thresh these all separately, keeping the grain from each in a small packet until planting time. When sowing, plant the grain from one packet in a row with the grains about 8in. apart in the row, then leave a gap of about 3ft., plant the grains from another packet and so on, leaving about 3ft. gaps between each packet. When mature, if any of these strains, i.e., the collection of plants produced from one head, have produced all the plants similar to the type chosen, they will be the only ones from which seed should be saved for next year's planting. If these plants again all come true to the original type there is a good chance of the type being a fixture, at all events under the particular conditions in which it was produced. When this stage is reached the variety should receive some distinctive name and be tested in the field in comparison with the best varieties of the district.

If the produce of the fourth generation, i.e., the first year in which the cross was put out on the "single head" system for fixing, does not show any strains with all the plants similar to the original type, the strains producing

t're best specimens of the ideal plants should be selected again on the "single head" plan.

KEEPING OF RECORDS.

All crosses made should be named as already pointed out, and this name entered in a book with the parents of the cross and the date when cross-fertilised. If possible, everything done to a particular cross should also be entered, and records such as description, &c., will be very useful in years to come. The name given to successful crosses when they are put in the field should also be entered. This keeping of records of names, dates, and parents should never be neglected, as it will certainly be of great help to anyone in future times should they think of using this particular variety as a parent for cross-fertilising.

SUMMARY.

Cross-fertilised heads should be harvested separately, threshed, and if they contain grain, named and kept apart from each other. Grains should be sown well apart in rows with a name label for each.

The two to four best heads of the first generation plants should be picked, threshed, and all grain obtained sown for second generation.

In the second generation all the good heads from plants likely to be useful should be saved, keeping each plant separate and giving it a distinctive name or number.

In the third generation anything that produces all its plants similar to the single parent plant of the second generation can be tried in the field next year.

Any cross in the third generation showing a mixture of types, if it is worth continuing at all, should be done so by selecting only one head from each plant of the suitable type, and planting the grain from each of these separately. Only the strains that produce the type wanted are used next seeding. If they again keep to the required type they can be distinctively named and compared in the field with standard varieties.

Records as full as possible should always be kept of at least name, year of cross-fertilisation, and parents.

COWS CHEWING BONES.

Cows frequently show signs of a depraved appetite, the most general manifestation being a tendency to chew bones. This is a sure indication that the food ration is not balanced. "Cows chew bones," says the Veterinary Lecturer (Mr. F. E. Place), "because they obtain from them certain food constituents that are missing in their fodder, and the habit is a preliminary of what is called dry bible. When cows are seen to be doing this, they should be given a lick of one part saltpetre and four parts bonemeal. When cows do this it will pay to dress natural pastures heavily with superphosphate up to 3cwts. per acre."

LONDON MARKET FOR BUTTER.

COMPETITION OF MARGARINE.

The London market as an outlet for the Australian surplus production of butter is of very considerable importance to dairymen in this State. There has been a marked falling off in the amount of butter exported from South Australia during the past five years, as will be seen from the fact that the value of the shipments during 1910 was £177,755, but the figure for the 1914-5 season is only £232.

This decrease, however, is directly attributable to the unusually long spell of droughty conditions, and the consequent depletion of dairy herds. With the return of normal seasons, however, it is anticipated that the herds will be built up again, and a large exportable surplus will be available. An outlet for this surplus will naturally be sought in the London market.

A great deal of attention has of recent years been given the manufacture of margarine, and the growing popularity of this article, as a substitute for butter, has been viewed with some alarm.

The Trade Commissioner in London (Mr. C. F. G. McCann) reports that on two occasions representatives from the various Australian Governments, and practically all the leading butter people with colonial interests, have met to consider the increasing competition of margarine with butter. A great deal of discussion was indulged in. and perhaps the most tangible result of the discussion was a proposition to approach the High Commissioner for Australia, in order to ascertain if it were possible to more closely ally the word "margarine" with the manufacture itself, instead of upon an outer wrapper, the main object being to prevent the substitution of the margarine for the Whilst butter is at the extravagantly high prices at which it has been for the last few months, it is only feasible that consumers will look for something to act as a cheaper substitute, and, as the manufacture of margarine has been conducted on such scientific, hygienic lines, and has approached such a state of perfection, it cannot be wondered at that consumers generally are accepting and preferring first-grade margarine to indifferent-quality butters.

The concluding paragraph of the report is optimistic, but at the same time a warning is uttered. "In quite a number of the butters shipped here there is room for much improvement, and if the same in telligent interest is brought to bear upon the manufacture of butter and also if values become somewhere near normal again, I do not anticipate that there will be much to be feared from margarine competition."

WATER.

[Mr. F. E. Place, B.V.Se., M.R.C.V.S., Government Veterinary Lecturer.]

Une hears much in these days of the analysis of foodstuffs and fertilisers, and occasionally of water when tea made from it is undrinkable, or a horse has died with 15lbs. of sediment in his bladder; but though one is careful to buy a manure on a guarantee of suitability, or a cake containing a given nitrogenous ratio, the water. which is more than 60 per cent. of the animal's body, receives little more attention than that necessary to prevent its running away, and none as to where it comes from. When on occasion it is submitted for analysis a statement of total solids sometimes approaching the salt content of the sea is used as the basis of opinion as to its suitability for stock; whereas it is not so much the actual amount, as the character, of the salts composing that amount which should be the governing factor in forming an opinion; for stock in South Australia thrive on saline waters which would certainly kill similar animals in other parts of the world, but thrive only because they have become inured to the class of water which, to a stranger, is the cause of considerable disturbance of health until he becomes used to it.

THE QUANTITY ANIMALS DRINK.

The amount consumed by a horse in South Australia per day varies from 8galls, to 20galls, while a cow takes from 6galls, to 13galls. Sheep vary so much, according to breed, that figures are not reliable.

For the larger animals an average of 3galls, at a drink is a fair estimate, and, as a horse takes from 2½ to 5 minutes to consume this, and a cubic foot of water is 6.5galls, while the horse occupies 3ft. of trough length while drinking, it is easy to calculate the trough accommodation required by a stable.

A fall of lin. of rain represents 4.5galls, to a square yard, so that the surface area of the roof catchment by the rainfall enables one to calculate the amount available. But an allowance must be made for evaporation, especially in the case of light showers, in which it may be seven-eighths of the fall.

The precautions against contamination of rain water are simple, but the horses' health will repay the cost of attaching some of the simple strainers which tank makers fit nowadays, as the rejection

of the filth from the gutters, dead birds, dung, etc., is very desirable, especially when long periods elapse between the falls.

On the whole the main objection to the rainwater tank is that it may be empty when it is wanted most. The dam, by its very nature of being a surface catchment, is open to every objection that can be urged against a water supply, and the points of a good water supply from a hygienic standpoint fail miserably in the dam. First, the quantity is open to contamination by both sick and healthy; second, the method of collection is the worst imaginable, the storage is that of a solution of filth, and the distribution is difficult; third, the quality of the water is of the lowest; fourth, its purification is difficult; fifth, the effects of such impure water are numerous; and sixth, chemically it is a poison.

CLEANSING THE SUPPLY.

Some of these drawbacks can be overcome by lifting the water to a tank before supplying the trough, and one has no hesitation in saying that the cost of this by windmill or engine will be repaid in the improved health of the horses in the first year. The absence of stock from the dam side is a great factor in the cleanliness of the water in it.

A filter bed at the inlet is not a costly affair and enables the germs which are anxious to do their part in clearing the supply to do their work under better conditions. The local sanitary inspector would always be able to suggest dimensions and formation most suitable to local requirements. Roughly, it would be a fan-shaped baffle containing limestone rubble and sand, and its cost would soon be recouped by the saving in silting up. Such a filter would be much less costly than the unsatisfactory additions of drugs like bluestone or iron to the water with a view to killing obnoxious things in it.

The presence of green vegetable matter on the surface of a dam is an advantage rather than otherwise; such plant life produces much oxygen and prevents much evaporation.

The throwing down of suspended dirt in the dam is necessary, and lime or alum are probably the best means of doing this. Suspended matter, which means living things, mostly such as worms, thrown down becomes comparatively harmless if undisturbed.

The salts dissolved in the water have to be got rid of by the kidneys and skin, and among the most likely to present difficulty in such elimination is sulphate of lime, the salt chiefly responsible for what is called permanent hardness in water, and present in large quantities in many bore waters in this State. Speaking generally, the lime salts cause much more trouble than the magnesia salts:

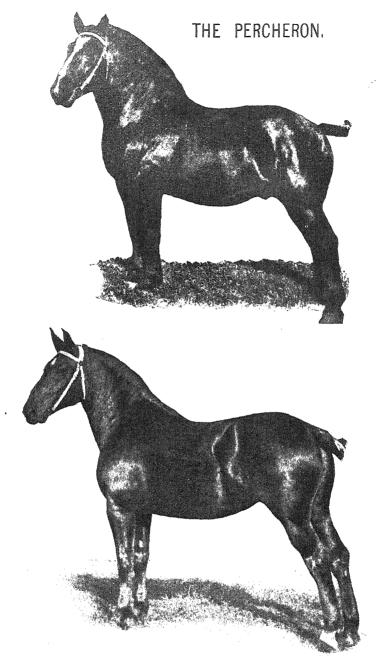
indigestion, harsh staring coats, and kidney troubles have been known to arise from 8grs. per gallon, and here over 100 often have to be put up with, while accumulations of precipitated lime and magnesia salts are far too common in parts of this State, filling and distending the bladder to such an extent that it cannot do its work at all, and bringing about the death of the horse.

Nature balances these things by providing vegetable acids in the fodder plants that counteract the effects of the salts. When man steps in and manger feeds this balance is disturbed; the trouble thus caused can be lessened to some degree by acidulating the water with vinegar at times.

There can be no doubt that for the full enjoyment of health an unlimited and pure supply of water is necessary, and though the effects of a bad supply may not produce in many cases any positively prejudicial effect such as one may see, yet it must be a means of exposing the health of animals to risk by lowering the tone of the system and rendering them more likely to fall victims to attacks of disease.

LIME.

Replying to questions in regard to the application of lime as a soil dressing, the Superintendent of Experimental Work (Mr. W. J. Spafford) says:—"The only reason that it is essential to apply quicklime some time before the seed is because it is caustic, and would possibly injure the germination of some of the grains. This is not the case with ground limestone, so it can be applied to the land any time that is convenient. It would certainly be a big mistake to apply lime in any form before ploughing operations, because it is at the immediate surface that its beneficial actions—sweetening the soil, improving mechanical conditions, encouraging the activities of bacterial action, and liberating potash—are most necessary; and also it is one of the soil constituents that washes much too easily into the subsoil. should be either drilled in to a very shallow depth or else broadcasted on the surface and only harrowed in. If you intend using ground limestone, make sure that it is very finely ground; it should feel to the fingers like flour—not the least bit gritty. If you can get a guarantee of fineness, do so: to get anything like results the bulk of it should pass through a sieve having 200 meshes to the inch."



"A fit model for Sunny South Australia to keep in mind, and one which would influence our farm horse stock for nothing but good."—F. E. Place, B.V.Sc., M.R.C.V.S.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, January 12th, there being present Mr. C. E. Birks (Vice-Chairman), and Messrs. Laffer, M.P., A. M. Dawkins, J. Miller, C. J. Tuckwell, T. H. Williams (Chief Inspector of Stock), and H. J. Finnis (Acting Secretary).

Noxious Weeds.

A discussion occurred on the subject of noxious weeds. At the instance of Mr. Laffer, it was decided to direct the attention of the Minister of Agriculture to the present unsatisfactory position, and urge the Government to give early consideration to the whole question, with a view of securing effective administration of laws dealing with the eradication of weeds.

FRUIT FOR THE SOLDIERS.

The Clare Branch of the Bureau wrote offering 300 cases of bestquality apples for transmission to the front for the use of the troops, provided that the Government would supply the cases, wood wool, &c., and forward the consignment to the chosen destination. The Acting Secretary intimated that as a similar offer from the Longwood Branch was referred to the Red Cross Society, he communicated with the secretary of that organisation, who informed him that no meeting had been held for some time. Mr. Laffer regretted, in a measure, that the matter had not been brought directly under the notice of the Commonwealth authorities, who, no doubt, would be glad to make arrangements for the fruit to be placed on board the various troopships proceeding to the front, the men on which would appreciate it immensely. was confident that if the business were handled properly thousands of cases of fruit could be dealt with in that manner. Fruit was so plentiful this season that nearly everybody would be able to give a few cases, and not miss them. It was resolved that the Acting Secretary should wait upon the officials of the Red Cross Society, indicate the views of the Board, and emphasise the need for taking early action.

SHOOT SCORCHER

The Clanfield Branch and the Coomandook Branch wrote for information regarding mallee-shoot scorchers. The former desired to know whether the Board would be prepared to sanction the holding of a demonstration of such machines in that district, and stated that it was prepared, in conjunction with the Parilla Well Branch, to make all the

necessary local arrangements. The Coomandook people wished to learn whether the Government had agreed to offer a bonus for an efficient scorcher. In respect to the latter inquiry, the Acting Secretary explained that the Government had indicated that at present the question must stand over. Mr. Laffer mentioned that a resident of Kangaroo Island had evolved a scorcher which he (the speaker) believed would fulfil all requirements. Finally the Board resolved in favor of the holding of a demonstration, provided that sufficient entries of machines were received to warrant the undertaking.

ANALYSING WEEDS.

A communication from the Mount Remarkable Branch expressed a desire that certain weeds (forwarded) should be analysed, and their nutritive or deleterious qualities assessed and published for the guidance of land and stock owners. It was resolved to inform the Branch that, in view of the present circumstances and the expenses which would be involved, the work could not be recommended.

RABBIT INSPECTORS.

A letter from the Koppio Branch contained the following resolution:—"That in the opinion of this Branch it is desirable that a Government inspector of vermin be appointed, free of local control." It was pointed out that the members considered that so long as the system of local inspectors continued in vogue satisfactory results would never be obtained. The Acting Secretary was instructed to reply that the Board had already drawn attention to the matter.

WHEAT ADVANCES.

The Board determined to send on to the Minister of Agriculture, "without comment," a request from the Warrow Branch that it should use its best endeavors to get the Government "to increase the advance on wheat to the farmers from 3s. a bushel to 3s. 6d. or 4s. a bushel."

CONFERENCES.

The Board endorsed the decision to hold the annual conference of the Mid-Northern Branches of the Bureau at Gladstone on February 16th. It was decided to ask the Quorn Branch whether it would be prepared to have the annual conference of the Upper Northern Branches at that township in March, and make the requisite arrangements.

NEW BRANCH.

The inauguration of a new Branch at Ki Ki was approved, with the following members:—Messrs. L. H. Angus, A. Angus, H. Redman,

T. Casley, E. Casley, S. Westgarth, A. Hoad, V. Carter, and Mrs. M. M. Feddern.

NEW MEMBERS.

The following additions were made to the membership of existing Branches:—Northfield—R. J. Lambert; Cygnet River—J. Ostertock, H. W. May, H. B. Schafer; Mount Barker—Norman Howard, — Hollanby; Wirrabara—Geo. Sizer, L. Sizer; Warrow—M. L. W. Kennett; Murray Bridge—M. P. Parish, Harry Davis; MacGillivray—A. D. Inglis; Glencoe—J. E. Telfer; Woodleigh—H. A. Good, J. Koch; Cygnet River—B. Schafer, Henry Schafer; Naracoorte—A. H. McBride; Waikerie—A. Woolford, E. Wagner, T. Taylor.

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of December, 1915, 1,227bush. of fresh fruits, 9,302bush. of bananas, 107 bags of potatoes, 208 packages of vegetables, and 11 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 374bush. of bananas (over ripe) were destroyed. Under the Federal Commerce Act 150 packages of preserved fruit and 1 package of seeds were exported to oversea markets during the same period. These were distributed as follows:—For France, 1 package of seeds; for South Africa, 150 packages of preserved fruit. Under the Federal Quarantine Act 9,103 packages of seeds, plants, and bulbs, etc., were examined and admitted from oversea markets.

During the month of January, 1916, 588bush. of fresh fruits, 4,384bush. of bananas, 3,822 bags of potatoes, 76 packages of vegetables, and 5 packages of plants, seeds, and bulbs, were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable protection Acts of 1885 and 1910; 266bush. of bananas and 1 package grapes (over ripe) were destroyed, and 39 bags of potatoes were returned to Victoria. Under the Federal Quarantine Act 1,837 packages of seeds, plants, and bulbs, &c., were examined and admitted from oversea markets. Of these 10 bags of linseed were ordered to be cleaned, on account of the presence of proclaimed weed seeds. No goods were exported under the Federal Commerce Act during the same period.

THE AGRICULTURAL OUTLOOK.

REPORTS FOR MONTH OF JANUARY.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:—

Booborowie.—Numerous thunderstorms, accompanied by very strong winds, but only light rains, have been a noticeable feature during this month. Crops are turning out very well; hot winds and frost reduced the average, which would otherwise have been exceptionally high. Dry feed is very plentiful, as most of the farmers are understocked. Stock is in good condition, but a few cases of illness occurred as the result of last year's drought. Cut worms and grubs are very numerous; the Rutherglen fruit fly is very prevalent. The water supply is very short; springs that have always been considered permanent have gone dry.

Veitch.—A few very warm days, with a shade temperature of from 105 to 107, and also a few days with hot winds, followed by heavy winds from the north-east, were experienced. Eighteen points of rain fell during the month, which is below the average for the district. Crops are all harvested. Natural feed is drying off; a small creeping saltbush is now making its appearance. Stock are all in healthy condition.

Eyre's Peninsula.—Early in the month thundery weather, with scattered storms, was experienced. One heavy local storm registered 70 points in half an hour. The latter part of the month has been dry and warm. Winds have been moderate throughout, varying from all quarters. There is an abundance of dry feed, chiefly spear grass, on the plains and open bush country. Flies of all description have been exceedingly troublesome to both men and stock.

Turretfield.—Almost ideal weather for harvesting was experienced during the month; 82 points of rain (50 points on one day) were registered. Crops throughout the district were turning out well. Natural feed was plentiful, and of good feeding value. Stock were in first class condition.

POULTRY NOTES.

[By D. F. Laurie, Poultry Expert and Lecturer.]

Who is to be Blamed?

Recent market reports published in Sydney state that the market was depressed owing to large shipments of eggs to arrive from Ade-It was stated that the quality was doubtful. papers we read, in the market reports, that owing to the hot weather the quality of the eggs coming into the sale rooms was such that buyers were very chary of operating. Much has been written about the egg and its varying quality; and at times an element of humor has been added—not perhaps shared by those who have had an unpleasant surprise in ascertaining the quality of an egg which manifestly was not It would seem, however, that in the 20th century, when we hear so much about the need for marketing all farm produce to the best advantage, it is a great reflection upon those who are responsible for the marketing of unsound eggs. Fatalism seems a characteristic of many people in this respect—they accept good eggs and bad with seldom a protest. Surely in these enlightened days no one cares to be thought so ignorant that good money is passively paid for produce that is not only unfit for consumption, but the sale of which is in the nature of fraud.

There are various enactments which govern the sale of milk, vinegar, and so on, but there seems to be no means of bringing to book those who are responsible for the sale of unsound eggs. It is bad enough within the confines of our own State. Here the only result is that consumers are discouraged from buying as many eggs as they would if reliable eggs only were permitted to be sold. The fact that people who pay, say, a shilling for a dozen eggs, of which lot three or four are unfit to use, are in reality paying 1s. 3d. to 1s. 4d. a dozen, is a matter of domestic economy. Where the real damage to trade occurs is in regard to our surplus eggs. South Australia exports a large surplus of eggs. The price depends first on the old law of supply and demand, and secondly upon the quality of the eggs themselves. none but fresh infertile eggs were concerned, then our merchantswith careful packing—could ship to the other States with the certainty that there would be no claims for unsound eggs. Now, some people are of the idea that the shippers are prepared at all times to bear uncomplainingly the loss on such shipments. That is not so. Due allowance is always made. During the colder portions of the year, when eggs are not affected by heat, the margin allowed is much less than in the hot months, when a large proportion of the eggs are approaching the limits of stability. At such times the risks are so considerable that buyers will not operate except at very low prices.

Now, there can be no doubt that among the producers there is a proportion who, whether from ignorance or carelessness, markets eggs of most inferior quality. These people, no doubt, receive market rates, less carriage, commission, &c., and trouble no more. They do not perceive, and probably do not care for, the fact that if all the eggs were of high quality, the average price paid by the collectors and others would be pence per dozen higher. The man who suffers most, and is practically impotent in the matter, is the careful poultry farmer who markets only fresh infertile eggs. If these are sent to the salesmen he at best receives for them the highest ruling rate. But the important point is that this rate is a depressed rate, due to the unsound eggs which come from the country. The sellers of unsound eggs are a drag on the industry.

We boast that our country is a free country; but surely one could not justify the statement that producers are free to sell articles of food—eggs—which are quite unfit for human consumption. While such people exist the poultry industry is hampered. Without doubt the industry would be in a better position if all those whose habit it is to market these unsound eggs were to cease keeping poultry of any sort. You cannot build up a good trade on a rotten foundation.

In apportioning the blame, it may be pointed out that the following are contributory factors:—

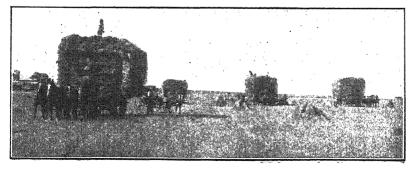
- 1. The presence of surplus male birds on farms, and the practice of allowing the males to run promiscuously with the farm flock. In this connection I know there is much ignorant prejudice. At any rate, the fact remains that while an infertile egg will keep for a lengthy period, and is the only egg which should be sold for human use, the fertilised egg is quite unfit for trade purposes.
- 2. Eggs are collected spasmodically, instead of regularly once a day at least. The eggs are permitted to remain in hot nests.
- 3. Broody hens occupy the nests in which other hens lay. They sit on the eggs until such time as they are gathered, by which time incubation is more or less advanced.
- 4. The eggs are packed in mouldy straw, which is often damp. Damp packing material generates fungoid growths, which invade the egg and cause decay.
- 5. The method of collecting and forwarding eggs to market is archaic and needs modernising.

Much improvement would be possible if storekeepers and others set their faces against dealing in doubtful eggs. It is a well-known fact that in country districts storekeepers are practically forced to buy stale eggs or lose custom. People have told me that they could only market the eggs collected on the farm once a fortnight. Such people should go out of the business. Far more improvement would result if it were made illegal to sell stale eggs, and if that much-wished-for enactment were vigorously enforced.

Let everyone who has eggs to sell carefully examine himself or herself on these points. Then, if the sinners are content to continue such practices, by all means let them wallow in their filth.

Local authorities are prone to display much activity in directions which to many people appear of secondary consideration. Does it not occur to them that the consumption of unsound eggs is a menace to human health? Naturally, even the most easy-going person does not consume a bad egg when it is boiled. Evidence has been given, however, that unsound eggs are used in a cooked form. Flavoring matter is added to disguise the awful taste of bad eggs—but the discerning palate oft notices that the egg triumphs. A proper system of inspection would remedy this evil.

One result of the war is the imperative demand for greatly increased production of food for the nation. The egg is a most important article of food. Not only is it a food for the ordinary man, but it is invaluable, and there is no substitute for the fresh egg, for use in hospitals for our sick and wounded heroes. One feels inclined to class with the Huns those who market rotten eggs when, with a little ordinary care and cleanliness such eggs could be sold fresh and sweet, and so increase the value of our productions.



Haymaking

POULTRY ON THE FARM.

A COUNTRY BREEDER'S YEAR.

"When visiting Mount Compass a few months ago," said the Poultry Expert (Mr. D. F. Laurie), "I was much interested in an excellent poultry plant owned by Mr. R. Peters, one of the pioneers in swamp reclamation and intense culture in that locality. had been in correspondence for some time on the subject of poultry breeding on modern commercial methods. I was agreeably surprised to find a fine set of breeding pens and scratching sheds erected in accordance with departmental designs, and well situated on sloping Mount Compass is immediately south of the Willunga range, and is high above sea level. The locality is a wet one, and the winters The poultry houses face about north, and are built of corrugated iron and sawn timber. The White Leghorn stock, bred from a Parafield nucleus, was exceptionally healthy. There were, in addition, a number of excellent specimens of the White Orpington breed, which were proving highly satisfactory, both as layers and for table Most of the chickens are artificially hatched, but at bird breeding. the time there were also eight or nine hens sitting on eggs. Mr. Peters kindly promised to forward an account of his year's work, and it will no doubt be an encouragement to others in the country to do likewise. Mr. Peters' figures are as follows:-

"Year 1915.—Stock on hand beginning of the year:—White Leghorn hens, 7; White Leghorn pullets, 36; Orpington hens, 12; Orpington pullets, 15; total, 70; value, say, 5s. each, £17 10s. In addition there was a small flock of cockerels. During the year there was slight variation in the number of hens and pullets: but careful analysis by Mr. Peters shows an average of 60. An average of 60 hens and pullets laid 9,222 eggs, averaging 1s. 14d. per dozen, £42 19s, 3d.; stock sold during year, £13 6s. 2d.; total, £56 5s. 5d. Cost of feeding on barley. at 5s. 6d. per bushel, and bran and pollard at correspondingly high prices, and cost of incubation, £41 12s. 2d.: 70 hens and pullets, stock on hand, 1915, value £17 10s.; 120 hens and pullets, stock on hand, 1916, value £30; increase on stock, £12 10s. Profit for year, £27 3s. 3d. Mr. Peters does not give a valuation of stock—the rate, 5s. each, I have suggested, as what stock of this class would net at auction in Adelaide. The cockerels are not taken into account, as it is presumed those on hand at beginning of 1915 balance those on hand at end of the year or at beginning of 1916. This little venture shows a profit at the rate of over 10s. a week for the year.

"The point in view is that I lectured at Mount Compass to an audience of 50 or more residents, few of whom were poultry breeders. The example of one of their number shows clearly that each settler in that district can, on the same moderate scale, add 10s. a week to his or her income, and at the same time produce eggs and poultry the sale of which would increase the State's production by £68 per settler.

"There are hundreds of settlers in South Australia who could do likewise, and so double our annual production of eggs and poultry. The wellbeing of the State depends on our primary production. Here is a source of great individual profit and also of national wealth."

POULTRY.—TELLING THE AGE OF THE BIRDS.

Do fowls bear marks whereby an amateur can tell their age? (2) Is it possible to tell by appearance whether a fowl is laying or idle? (3) Do you suggest that a fowl which has had the run of a farmyard from the time it was a chick cannot profitably be kept after it is three years old; what about for hatching? (4) If the age cannot be recognised by appearance, what method would you recommend for marking? are questions asked by a correspondent from Murray Bridge.

In reply the Poultry Expert said:—(1) As fowls increase in age the skin becomes tougher, the shanks rough, and in some hens the head thickens. The skin on the breastbone always thickens and is hard. Male birds develop long spurs. (2) As a rule a laying hen has a red comb, whereas non-layers may have a shrivelled comb; this is, however, by no means a certain guide. (3) The average hen, for market egg production is most profitable during her first year after she starts laying; some hens lay well during the second year. Unless a hen is known to be a first-class layer she is not worth keeping after the second laying season, even to produce eggs for hatching. (4) Your best plan is to toe punch each season's chickens. This is done by punching a hole, with a small leather punch, in the web between the toes; right foot this year and left foot next year. You can vary by punching two holes on either foot, and so on. Make a note of the position of the hole punched each season."

TESTING DAIRY STOCK.

THE VALUE OF MILK RECORDS.

In the January issue of the *Journal* attention was drawn to a scheme under which the Department of Agriculture undertook the testing of dairy cows.

Dealing with the question of the value of milk records, the Dairy Expert (Mr. P. H. Suter) says:—

For some years there has been a general desire on the part of Agricultural Departments and societies to encourage the testing of the individual dairy cow, with a view to improving dairy stock in milk and butter production.

Far too many view this question of herd testing as a fad, and not worthy of their consideration. However, it is many times more profitable to keep one cow yielding 4galls. of milk testing 4 per cent., than two cows, giving 2galls. of the same quality milk.

It is well known that there are cows in almost every herd which are giving a miserable return for the food, labor, and capital involved. The use of the scales and tester will discover these, and the milk and butter record of each cow is not alone of value to the supplier of milk and cream to the factories, but the city distributor can readily satisfy himself as to whether the milk of each cow is within the fat standard laid down under the Foods and Drugs Act.

To the stud breeder it is even of more importance, for not only does he ascertain the milk and butter production of each beast, but he can select with certainty the best cows for breeding purposes, and the offspring are worth guineas more per head.

The keeping of milk records has, in addition to the foregoing, other advantages such as the following—

- 1. Any slight reduction in yield will be noticed, and investigation as to the cause can be made at once. For instance, when a cow is unwell her milk yield generally diminishes; milk records, therefore, may often be the means of detecting an ailing cow.
- 2. Feeding may be carried out more economically. Since the market price and milk-producing values of foods are not necessarily directly proportionate, it is quite possible to feed a cow expensively and yet not produce any better results than could be obtained from cheaper foods.

- 3. Where milk records are kept, the influence of change of food and the effect of different climatic conditions can be noted.
- 4. There is increased interest on the part of both farmer and employees in their labors. The faculty of observation is developed, cause and effect in milk production are studied side by side, and a stimulus is given to the further study of data bearing on the work. Records have therefore a distinctly educational value.
- 5. Milk records supply data which enable the breeding and selection and feeding of cows to be conducted in an intelligent manner, and they thus assist materially in placing dairy farming on a sounder business footing.
- 6. Milking qualities are largely hereditary, and the progeny of a heavy milking cow are likely to inherit the characteristics of their dam.

It is therefore of first importance that the dairy farmer should have a record of the performance of his cows, and should select the heavy milkers to breed from for his own herd. Dairy qualities are also transmitted through the bull used, and it is equally important to be able to show that he is descended from a heavy milking strain.

The value—the commercial value—of milk records depends on their accuracy, and in order to assist farmers in securing that care is taken by milkers to keep accurate records, it has been arranged that officers of the Department inspect and check the records kept in connection with the scheme referred to above without giving notice of the dates of their visits.

The milk records should run in periods of nine to 12 months, so as to obtain an annual record of the whole herd. An annual milk record is, in effect, a history of a dairy cow for 12 months. It is not merely a statement of the amount of milk which a cow yields during 52 consecutive weeks, nor does the term imply that a cow was "in milk" during the whole of that period.

Farmers should see to it that they are not harboring any non-profitable cows. This can only be done by first feeding them sufficient milk-making food, and subjecting them to the test with the scales and Babcock tester.

During my recent visit to the Western District of Victoria I was struck with the remarkable figures disclosed by the Colac testing association for the first 30 days. The best individual cow from all the herds tested gave 61.8lbs. of butter-fat, equal to 71lbs. of commercial butter (butter for table use), and the worst cow 5 1-10lbs., equal to only 5.98lbs. of commercial butter. The best dairy herd 32.1lbs. of butter fat, equal to 36.90lbs. of commercial butter, and the worst herd 12.6lbs. of butter fat, equal to only 14.49lbs. of commercial butter

The ten (10) best dairy cows averaged 52lbs. of butter fat, equal to 59.8lbs, of commercial butter.

The ten (10) worst gave 8.89lbs, butter fat, equal to 11.22lbs, of commercial butter.

For the purposes of making an exact comparison it would, of course, be necessary to supply a complete record of all food consumed and the period of lactation. Nevertheless, the above figures, under any circumstances, go to prove the great difference in butter production of individual cows.

(To be continued.)

FEEDING OF DAIRY COWS.

Offerton Bulletin No. 5, June, 1915, gives the result of dairy investigations extending over a period of three years. Experiments were conducted with a view to obtaining information on the following points:—

- 1. The effect of milking at equal and unequal periods on the quantity and quality of the milk.
- 2. The effect on the quantity and quality of milk of a small amount of phosphates fed directly to cows.
- 3. The results of milking cows three times a day as compared with milking them twice.
- 4. Comparison of palm-nut (kernel) cake with Bombay cotton cake as a food for dairy cows.

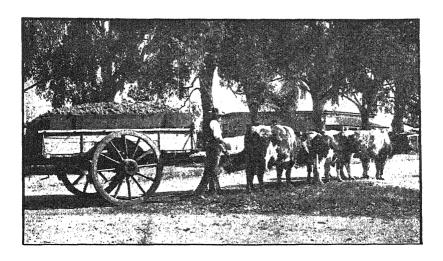
The results of the experiments under the different headings may be summarized as follows:—

1. It cannot be said that the total quantity of milk is influenced by the equal or unequal period of milking, but the percentage of fat is very materially influenced thereby. Further, the relationship between the times of milking and percentage of fat is a constant one. The results of the experiments, which extended over a considerable period. thus definitely confirmed previous experience.

2. The improvement in poor pastures due to the application of phosphatic manures, and consequent increased production of milk and beef on such pastures being well known, it was decided to test whether phosphatic material in the form of precipitated bone phosphate, fed directly at the rate of loz. per cow per day, would have any influence on the temperament and nervous system of the cows, and so influence quantity and quality of milk.

In so far as these two latter factors were concerned, no appreciable result was obtained, nor was there any evidence of stimulation or otherwise of the nervous system.

- 3. No increase whatever in the milk yield was obtained by milking three times a day in preference to twice. On the contrary, the extra driving and interference with the cows have produced results of a negative character. The quality of the morning milk is also affected adversely by an additional milking. The point is of interest to milk producers in the close vicinity of towns.
- 4. The chemical composition of the palm-nut cake used in the experiments approximated more closely to the common cotton cakes than to the more albuminous types like decorticated cotton cake or soya cake. Although the cows receiving the palm-nut cake did not increase in weight in any undue proportion compared with those receiving Bombay cotton cake, yet their general condition was improved. Substantial evidence was obtained to show that palm-nut cake gives a higher percentage of fat in the milk.



WHEAT MARKET.

The f.o.b. price quoted on December 31st, viz., 5s. 3½d., has been maintained without alteration during January.

STOCKS.

Stocks held by shipping agents on January 31st amounted to 370,024 tons, the quantity of grain shipped to that date being 24,901 tons.

PRODUCE MARKET.

A. W. Sandford & Co., Limited, report on February 1st:-

BUTTER.—The weather during January was, on the whole, cool, but was marked with one or two short snaps of heat. In consequence of this, produce was therefore able to travel and keep in better condition than has frequently been the case in corresponding periods during previous years. Production has rapidly declined, however, and this has applied to the eastern States as well, so that values have firmed considerably at the close of the month, "Alfa" being 1s. 6½d. per lb.: "Primus," 1s. 5½d.; separators and dairies. 1s. 1d. to 1s. 4d.; stores and collectors, 10d. to 1s. 0½d. per lb.

Eggs.—Supplies have maintained very well indeed, and until well on in the month prices ruled at under 1s. Towards the close, however, a seasonable decrease was noticeable, and market is now—hen, 1s. $0\frac{1}{2}$ d. per dozen; duck, 1s. $1\frac{1}{2}$ d.

CHEESE has again had very heavy turnover, both for local and export. Under the influence of overseas trade prices are substantially higher than during December, so that present quotations are from 10½d. to 11d. per lb. for large to loaf.

Bacon.—Quantities of bacon show a considerable shrinkage, and curers have great difficulty in securing their supplies of the live animal, so that there is a dearth of choice factory lines. Best factory sides are selling at 1s. 3d. to 1s. 4½d. per lb.; hams, 1s. 6d. to 1s. 7½d. per lb.

HONEY.—First grade honey is phenomenally scarce, and indeed apiarists have never known a season where there has been such a small take, and buyers are not nearly able to obtain their requirements, even at high rates. Prime clear extracted honey is worth 5d. to 5½d. per lh.; beeswax, ls. 4d. per lb.

ALMONDS.—The new season's crop is not yet being marketed, although during the next few weeks there should be consignments arriving. Brandis are 8d.; mixed softshells 7d.; hardshells, 3d.; kernels, 1s. 3d. per 1b.

LIVE POULTRY.—As was only to be expected with the large numbers marketed right up to Christmas, supplies fell off during January, and many of the birds submitted were only partly matured, but rates for good quality have well maintained. Heavy-weight table roosters fetched 4s. 3d. to 5s. each; good conditioned cockerels, 3s. 6d. to 4s.; plump hens and medium cockerels, 2s. 6d. to 3s. 5d.; small hens, 2s. to 2s. 6d.; light birds 1s. 3d. to 2s. (chicks lower, according to size); ducks, 2s. 6d. to 3s. 9d. for fair to good; geese, 3s. 6d. to 4s. 3d.; pigeons, 9½d.; turkeys, from 1s. 3d. to 1s. 6d. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—The absence of late spring and early summer rains has had a marked effect upon the supply of early potatoes, and local gardeners were unable to supply more than a fraction of the Adelaide market requirements, and as only a very small quantity was obtainable in the Mount Gambier district, the shortage had to be made up by importations from the Warrnambool district of Victoria, and prices have advanced substantially. Onions.—There is no alteration to report in the onion market; local supplies continue to be more than sufficient for requirements, and as there is no opening for export, rates are down to a level which must be very unprofitable to the grower. Quotations:—Potatoes—£13 to £14 per ton of 2,240lbs. on trucks Mile End or Port Adelaide: Onions—£3 per ton of 2,240lbs. on trucks Mile End or Port Adelaide:

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of January, 1916, also the average precipitation to the end of January, and the average annual rainfall.

Station.	For Jan., 1916.	Jan.,	Av'ge. Annual Rainfall	Station.	For Jan., 1916	To end Jan., 1916.	Av'ge. Annual Rainfall
FAR NORTH AND	UPPE	R NORT	H.	Lower Nor	тнсот	ıtinued.	}
Oodnadatta	0.58	0.59	4.76	Spalding	0.80	0.48	20.25
• • • • • • • • • • • • • • • • • • • •	0.90	0.24	7.58	Gulnare	0.84	0.55	19.74
Farcoola	0.02	0.46	6.04	BundaleerW.Wks.	1.16	0.44	17.29
Hergott	0.20	0.53	6.70	Yacka	0.50	0.51	15.27
Farina	0.20	0.68	8.66	Koolunga	1.08	0.59	
Leigh's Creek	0.10	0.71	9.22	Snowtown	0.23	0.65	1
Beltana	0.40	1.07	12.83	Brinkworth	0.69	0.37	
Blinman		1.01	12 00	Blyth	1.27	0.69	
Hookina	0.42	0.51	12.22	Clare	1.13	0.88	
Hawker	0.14		11.78	Mintaro Central .	0.71	0.54	
Wilson	0.70	0.60	10.26		0.89	0.90	
Gordon	0.18	0.37	13.78	Watervale	6.73	1.03	
Quorn		0.59		Auburn			
Port Augusta	0.70	0.53	9.46	Hoyleton	0.72	0.80	1
Port Augusta W.	0.65	0.47	9.36	Balaklava	0.53		
Bruce	0.08	0.32	10.01	Port Wakefield	0.24		
Hammond	0.15	0.63	11.46	Terowie	0.64	1	
Wilmington	0.41	0.83	18.26	Yarcowie	1.54	3	
Willowie	0.11	0.33	11.90	Hallett	0.60		
Melrose	0.31	1.25	23.04	Mount Bryan	0.87)
Booleroo Centre	0.10	0.79	15.83	Burra	0.80		
Port Germein	0.16	0.65	12.84	Farrell's Flat	0.54	0.81	18.87
Wirrabara	0.44	0.63	18.91		-		
Appila	0.11	0.62	15.08	West of I	IURRAY	RANG	E.
Cradock	_	0.56	10.86	Manoora	1 0.60	0.5	5 18.09
Carrieton	0.31	0.16	12.22	Saddleworth			
Johnburg	0.39	0.53	10.21	Marrabel	3	1	
Eurelia	0.68	0.73	13.24		,		
Orroroo	1.19		13.42	Riverton	1		
Black Rock	1.01		12.25	Tarlee	1		- 1
Petersburg	0.82		13.07	Stockport			
Yongala	0.30	.1		Hamley Bridge	1		_ ,
Tongala	1 0 00	,	1	Kapunda			
Nor	TH-EAST	r.		Freeling		, .	
	1 0.69		1	Greenock			
Ucolta Nackara			_	Truro			-
		1	8-22	Stockwell			
Yunta	1		1	Nuriootpa			
Waukaringa)			Angaston			
Mannahill		3	1	Tanunda			
Cockburn	. (0.73		Lyndoch	. 0.9	6 0.7	5 23.0
Broken Hill, NSW	1 —	1 0.16	, , , , ,		D-	. *****	
Lowe	R Nor	rh.		11	IDE PI		00 1 7 6 9
Port Pirie	0.13	3 0.60	13.21	Mallala			
Port Broughton		1 0.6	7 14.33	Roseworthy			
Bute			15.42	Gawler			
Laura	1			Two Wells			
Caltowie				Virginia			75 17
Jamestown		- 1	- 1	Smithfield	. 0.4	, -	48 17.
Gladstone					. 0.		75 18
Crystal Brook		- 1			0.		76 21
Georgetown					\ 0.'		73 21
Narridy	-)	- I			0.		59 19
Redhill	- 1		- 1	11		60 O	64 18
LOCULLI	. 1 0.0	· · ·	_ ,	11	1	(í

RAINFALL—continued.

		2012	4111 1122	2 30/11011000			
Station.	For Jan., 1916.	To end Jan., 1916	Av'ge. Annual Rain:ali	Station	For Jan., 1916	Jan,	Av'ge. Annual Rainfall
Adriaide Plains—continued.			West of Spencer's Gulf-continued.				
Magill	1.06	0.82	25.69	Streaky Bay	0.27	0.46	15.31
Glen Osmond	1.17	1.09	25.26	Port Elliston	0.93	0.39	16.49
Mitcham	0.54	0.83	23.47	Port Lincoln	0.13	0.61	19.88
Belair	0.65	1.03	28.64	Tumby	0.23	0.27	15.00
M T				Carrow	0.10		-
Mount Lo	FTY KA	INGES.		Cowell	0.08	0.41	11.76
Teatree Gully	1.01	0.74	28.19	Point Lowly	0.67	0.42	12.21
Stirling West	1.03	1.50	46.70				
Uraidla	1.07	1.26	44.35	Yorke's	PENIN	CITT A	
Clarendon	0.92	1.15	33.67	LURKES	LEMIN	SULA.	
Morpheit Vale	0.48	0.84	23-32	Wallaroo	0.60		14.05
Noarlunga	0.44	0.64	20.28	Kadina	0.29		15.88
Willunga	0.54	0.76	25.98	Moonta	0.11	0.55	
Aldinga	0.47 0.39	0.56	$20.34 \\ 20.65$	Green's Plains	0.20	1	
Normanville		0.59		Maitland	0.13		
Yankalilla	$0.51 \\ 0.20$	0.53	22.78	Ardrossan	0.15		
Cape Jervis Mount Pleasant .	1.37	0.44 0.79	$16.34 \\ 26.87$	Port Victoria	0.09		
Blumberg	0.90	1.10	29.38	Curramulka	0.10		
Gumeracha	1.08	1.07	33.30	Minlaton	0.20		
Lobethal	0.58	1.02	35.38	Stansbury	0.21		
Woodside	0.65	0.99	31.87	Warooka	0.19		
Hahndorf	0.87	1.07	35.45	Yorketown	0.10		1
Nairne	0.55	1.00	28.83	Edithburgh	0.29	0.52	10.40
Mount Barker	0.90	1.03	30.93				
Echunga	0.69	1.09	32.83	SOUTH AN	D Sour	H-EAST	١.
Macclesfield	0.57	0.92	30.72				
Meadows	0.49	1.07	35.52	Cape Borda	0.25		1
Strathalbyn	0.37	0.72	19.28	Kingscote	0.25		
				Penneshaw Cape Willoughby.	0.20		
MURRAY FLA	TS AND	VALLE	Y.	Victor Harbor	0.37		
Wellington	0.39	0.80	15.01	Port Elliot	0.36		
Milang	0.46	0.70	16.08	Goolwa	0.98		
Langhorne's Brdg	0.21	0.48	15.27	Pinnaroo	0.53		
Tailem Bend	0.19	_		Parilla	0.99		
Murray Bridge	0.39	0.64	14.32	Lameroo	0.91	0.49	16.55
Callington	0.42	0.76	15.65	Parrakie	0.36	3 -	
Mannum	0.02	0.53	11.67	Geranium	0.56		_
Palmer	0.26	0.47	15.60	Peake	0.51		J
Sedan	0.34	0.54	11.92	Cooke's Plains) .	
Blanchetown	0.41	0.57	10.71	Meningie	0.46		
Eudunda	0.56	0.78	17.33	Coonalpyn	0.53	1 .	
Sutherlands	0.85	0.28	10.60	Tintinarra	0.46		18.78
Morgan Overland Corner	0.32	0.50	9.29	Keith	0.39		19.76
Renmark	0.09	0.54	11.42	Bordertown	1.69		
Loxton	0.33	0.47	10.99	Wolseley Frances	1.34	1	
	0.40	1 —	1	Naracoorte	1.39		
				Penola	1.78		
West of S	PENCER'	s Gull	`.	Lucindale	1.13		1
Eucla	0.77	0.65	10.13	Kingston			
White Well	0.96	0.49	9.67	Robe	1.09		
Fowler's Bay	0.33	0.42	12.11	Beachport	-	0.98	
Penong	0.57	0.37	11.93	Millicent	1.71		
Murat Bay	0.20	-	1 -	Mount Gambier .	1.87		
Smoky Bay	0.06	1 -	1 -	C. Nrthumberland			
		1	1		1	1	1

EVAPORATION OF APPLES.

By C. H. Beaumont, Inspector of Orchards, No. 2 District.

It always happens that portion of the fruit crop is not of sufficiently good appearance or quality to enable the orchardist to market it as first grade, and to sell it as second grade does not pay, or to do so may be against the interest of his particular brand.

To use this fruit is the object of evaporating. This process enables growers to deal quickly with a bulk of fruit, and at the same time make a product that is readily saleable at a fair price, if the work of evaporating is given the attention that it deserves.

The general principle involved in the process is to drive off, by means of heat, either of the sun or artificial, the moisture contained in the fresh fruit. It is not proposed to explain the process of sun drying in this article; Bulletin No. 31 of the Department of Agriculture describes it fully. Artificial drying of fruit, especially of apples and plums, is conducted in furnaces or drying kilns, called evaporators.

PREPARATION OF APPLES FOR EVAPORATING.

Almost any variety of white-fleshed apple will make a good evaporated product, but the fruit must be fully matured; half grown windfalls or codlin-damaged, prematurely-ripened fruit are not good enough.

The first operation is the paring and coring. This is done with a machine made for the purpose. There are several types of these machines, all made in America, obtainable at prices from £4 to £10 each, by indenting through any of the principal hardware merchants. The machines are made for hand or power work, as required, and will peel and core a bushel of apples of medium size in about ten minutes. After leaving the machine, the apples are "trimmed" with a knife, called a trimming knife, made for the purpose. It is a fixed blade, about 4in. long, with a pointed end, and it is used to remove all bits of skin missed by the machine, also all bruised or diseased parts, and it is usual to cut off the ends of the fruit to form a flat part. These knives can be obtained with the machines.

SULPHURING.

Within two hours after trimming the fruit must be "sulphured," that is, be subjected to the fumes of burning sulphur, until enough has been absorbed to prevent discoloration, and the operation should

be completed in as short a time as possible; 30 minutes to 40 minutes Half a pound should be ample time if the sulphur is burning well. of sulphur will bleach a hundredweight of apples. The bleaching may be done in a portable, airtight, wooden box, about 5ft. by 3ft., and 4ft. high, or one made by stretching malthoid or similar material on a The fruit is put up in cases made with narrow wooden framework. battens on the sides and bottom, and the cases are piled up to suit the shape of the bleacher, care being taken to leave a space at one end A hole should be made in the earth to take a for the hot crucible. 10in, plumbago or clay crucible, for preference. If a furnace be available the crucible is made red hot, and some red-hot coals put in the bottom of it before it is placed in the hole; the bleacher is then put over the fruit, the end raised enough to permit of throwing the piece of roll sulphur into the crucible, and then closed down tight. little sand around the edge will help to keep it airtight. in diameter is required in the top of the box at the end away from the This hole is to be closed with a plug as soon as the sulphur fumes appear. The manufacture of the portable bleacher is described in Bulletin No. 31.

THE LARGE PLANT.

In a large evaporating establishment a fixed pair (or more) of bleaching boxes is necessary. These are made of 3in. by 2in. hardwood, 6ft. high, and 4ft. by 4ft. inside measure, lined with 5in. tongue-and-groove floor boards, except the floor, and with a tight-fitting door Wooden crossbars are placed inside to keep the fruit boxes apart. The floor is of earth or brick, a hollow being formed for the hot crucible. A 3in. hole is made in the top of each compartment, and a plug fitted for the same. The operation of the fixed bleacher is the same as for the portable, and there should be no trouble if the crucible is properly heated. There are several patterns of mechanical bleachers, but they are expensive and intricate, and get out of order easily owing to the sulphur fumes.

Over-sulphuring has resulted in action being taken in varous countries under the Food and Drugs Acts to prevent the use of this process, and it has been recommended that a saline solution made by dissolving 1lb. of common salt in 5galls. of water should be used as a dip. The fruit is thrown into the dip as soon as trimmed, and taken out again within five minutes, and drained and placed on travs to dry.

After bleaching the fruit is sliced or quartered, if required in thatform. Slicing and quartering is done by machines made for the purpose, and obtained from the manufacturer of the parer and corer. No commercial concern can afford to be without these up-to-date appliances.

THE DRYING KILDS.

Evaporating or drying is the next operation, and for this part of the process various sorts or patterns of kilns are used. The best type is that which permits a steady current of hot air to pass over and through the fruit, and then carries off the moist air resulting-in short, to imitate as near as possible a "hot-wind day," This may be brought about by natural or forced draught. A natural draught kiln, a type favored and largely in use in the United States of America. may be built of brick or of wood and iron, preferably of brick, as it minimises the danger of loss by fire. A single kiln, or pair, or nest of four may be constructed. One kiln, to work, say, 100bush, per day, would be 20ft. by 20ft. inside measurement, and is built in two floors; the lower floor (the floor of which may be of earth or brick) is the fur-Figure 1 shows the construction of this kiln. nace may be made circular and be placed in the centre of the room; it is 4ft. high and 4ft. in diameter, of 5in. boiler plate, lined inside with firebrick, with a set of circular firebars, and a door for fuel. top is of cast iron, about 13 in. thick. The flues are taken off from the top, and are of sheet iron, 10in. in diameter and 3/16in. thick, with the necessary bends. Figure 3 shows the design. The flues must follow the course shown in Figure 1, and rise gradually until they enter the stack at the back of the kiln. Cast-iron flanged pipes will last longer than the sheet iron as flues The flues are hung to the floor joists above by 2in. by 3in. iron straps, which are pierced for three 3in. bolts, and have a quarter turn, to fit flatly to the joists. part should the flue be nearer than 3ft. from the underside of the floor The stack may be of brick or of 3/16in, sheet iron 18in. in diameter, and at least 20ft. high, and stayed with three guy ropes. There are doors on two sides of the furnace room, 6ft, by 2ft, 6in. Ordinary Jin. ledge doors are sufficient if well fitted, and the heat will be regulated by these doors. The use of the long furnace is the same, except that this furnace is placed as shown in Figure 1, and is fired from the outside. It is built of brick, the lining being firebrick, and has the usual door, firebars, bridge, &c. The top is of cast iron, made in sections, as shown. The furnace should be well braced or tied togther, and must be built quite independently of the wall. (Fig. 6.)

The floor of the upper room or kiln proper is formed of 9in. by 3in. joists, 18in. apart. These joists may be continued through the walls if required, for the extension of the building. The flooring is made of tapered battens, \(\frac{1}{2} \) in. thick, 1in. wide at the top, and \(\frac{1}{2} \) in. wide at the bottom, with a \(\frac{1}{2} \) in. space between the battens at the top (see Figure 2). This floor requires frequent scouring with soapy water when in use. Close-fitting doors are provided in two walls, similar to those in the

furnace room below, and through these doors the raking of the charge is conducted. The roof is constructed of 7in. by 3in. and 7in. by 1½in. timbers, brought to a point or to a ridge, if more convenient for adjoining structures. The vent for the outlet of moist hot air should be at least 4ft. by 4ft., and rise not less than 6ft. above the ridge. It may be formed of 3in. by 2in. studs, with 3in. by 1in. battens, and 24-gauge G.I. louvre slats (Figure 4). A roof of ordinary G.I. completes the work. A sheet of asbestos should be placed on the underside of the floor joists directly over the furnace to deflect the heat at this point.

If it is desired to build the kiln of wood and iron, a similar idea may be carried out; the kiln should be lined throughout with asbestos or other similar fireproof sheeting, and insulated by filling the space between the lining and the outer wall with small coke.

Steam pipes may be used for heating, instead of direct heat; a boiler pressure of at least 50lbs. will be necessary, but it must be understood that the attendant will have to hold a certificate of competency.

The temperature to be maintained is from 140 deg. to 170 deg. Fahr., and the constant use of the thermometer is necessary to secure uniformity of working. The method of drying apples in bulk is to spread them (after sulphuring and slicing and quartering) evenly over the slatted floor, to a depth of 6in., in case of whole apples or quarters, but less if in rings, the kiln being at the time well up to the required heat. About hourly the fruit must be gently moved or stirred with a wooden rake.

Any small pieces will go through the floor. From 20 hours to 24 hours are necessary to dry out a full charge. The product is then removed to the sweating room, where apples from all parts of the kiln are well mixed, and allowed to remain at least 24 hours and until cold and required for packing; but they should be turned occasionally if to be left for a lengthy time; the object of the sweating is to cool and to get an even product. If dried properly the fruit should be tough and pliable, and it should be difficult to squeeze any juice out of it. The packing depends on the trade requirements, but if it is intended to case it, a good press will be wanted, and can be obtained with the other machinery.

RACKS FOR PLUMS, ETC.

For the use of this type of kiln for drying plums the kiln must be fitted with racks to take the trays of dipped fruit. The dipping and preparation of plums for drying is fully dealt with in Bulletin 31, and the work of kiln drying is practically the same as sun drying. An easy method of making a sectional rack (Figure 5) is by running \(\frac{3}{2} \) in. round iron bars through 3in. by 2in, wooden standards placed to suit

the size of the tray. Three of these sections are used to form the rack, and are kept apart and in place by through cross bolts, and spaced by having short lengths of piping threaded on to the bolts before being fixed.

FORCED DRAUGHT.

Forced draught of heated air is obtained by using a fan or blower worked by engine power, such as the motor of a spray pump, and forcing the air through hot pipes and into the drying chambers, or by reversing the process and using the fan as a suction, and drawing the air first through the heated pipes and thence through the evaporator. Travs are used to hold fruit when forced draught is intended, and those with fine mesh wire netting bottoms are preferable. dries out in from five to six hours. A brick furnace for heating air is shown in Figure 7, and is built similarly to Figure 6, except that six 6in. pipes are built in over the fireplace. The air is forced by the blower into the air chamber over the front of the furnace, which is made of 16-gauge G.I.; the air chamber is connected with the furnace pipes by the necessary bends, and the hot air is received into a similar air chamber at the back of the furnace; from this it is passed on to the evaporator, through a 10in. G.I. pipe of 16 gauge. Another type of hot-air stove is made with cast-iron sides, and lined with firebrick; this is a very handy furnace, and is easily taken to pieces and stored away when not required. It is shown in Figure 8, and is obtainable in Adelaide.

COMPARTMENT KILN.

Two patterns of evaporators for use with forced draught are shown. The style shown in Figure 9 is made in several compartments, of which one or more may be used as required. The main frame of the kiln is of 6in. by 6in. studs, and the divisions of 3in. by 2in. studs. compartment is lined with in. flooring boards, and two half-doors are hung in front. The racks for holding the trays are made as already described and shown in Figure 5. The hot air is conveyed in a 10in. by 10in. square G.I. pipe or conduit at the bottom of the back of the kiln, and is admitted to the compartment through a number of 3in. holes bored in the lining. By the use of plugs the current can be con-The outlet for the moist air is into a similar conduit at the top of the back of the kiln, and is controlled in the same manner, and is taken from the conduit by a stack 6ft. high at one end of the conduit. The doors are made fairly airtight by closing on to strips of felt; the fasteners, ordinary buttons, are spaced equally, three on each door. Different fruits can be dried at the same time, as each compartment can be worked independently.

A CONTINUOUS KILN.

Figure 10 shows a continuous or sloping kiln for use with hot air. Only two compartments are shown, but any number may be built. The main standards are of 6in. by 6in. jarrah, the intermediate stays being of 3in. by 2in.; the lining is of Jin. flooring boards, or may be of sheet iron if desired; 2in. by 2in. battens firmly secured to the lining boards by screws are used to hold the trays, and should allow a space of about 3in, between each layer of trays. A tight-fitting door is fixed The hot air is introduced into the kiln at the lower end, at each end. thence through the kiln until it escapes by the hopper and flue at the higher end. In operation, the trays of fruit are loaded into the kilu at the higher end or second floor. When a trav is removed from the kiln at the lower end, all the others will slide down to take its place, and thus make room for another set of trays at the top end. Apples will take about five hours to dry in this type of kiln, and an excellent product results.

In all the types of furnaces referred to herein it has been taken for granted that wood fuel will be used.

WASTE.

There must necessarily be a large quantity of waste in preparing apples for evaporating, and some method of dealing with it should be decided on. It may be made into vinegar, or it may be dried and stored in bags of close texture for future use for feeding pigs and poultry. The small bits of evaporated fruit, which are separated when packing, may be packed separately and sold as bits or chops at a cheaper rate than the full rings.

GENERAL.

The operation of evaporaters must be continuous or mould will set in.

Before the fires are allowed to go down the fruit should be removed from the kiln.

Cleanliness is a great tactor for success, and the kiln floors and racks need to be scoured frequently; hot water and soap is the best cleanser, and if applied with the spray pump a good result will be achieved.

Growers who are interested in fruit drying should write to the Department of Agriculture for Bulletin No. 31, which explains more extensively the drying of other fruits and the making of trays, &c.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report Meetin					Dates of Meetings.	
	Page	Feb.	Mar.		on Page	Feb.	Mai
	*			The second secon			
myton	*		-	Georgetown	664		
ngaston	*		'	Geranium	*	26	28
ppila-Yarrowie	*	_		Gladstone	665		
rden Vale & Wyacca	*6		_	Glencoe	•		_
rthurton	*			Glencope	*		_
Balaklava	*			Goode	*		_
Beaufort	*		_	Green Patch	*		_
Beetaloo Valley	+	18	28	Gumeracha	*		_
	*			Halidon	*	-	_
Belalie North	667-70	16	22	Hartley	675	16	1
Berri	672			Hartley	*		_
Blackwood	*			Hawker	*		
Blyth	*			Hilltown	664	15	1
Bookpurnong East	*			Hookina	*	10	1
Booleroo Centre	*			Inman Valley	678	10	1
Borrika	*			Ironbank	*	19	1
Bowhill	1 1		-	Julia	*		-
Brinkley	*		-	Kadina	*		-
Bundaleer Springs .	*			Kalangadoo	1 1	12	1
Burra	泰	_	-	Kanmantoo	678	12	1
Bute	*	-		Keith	1		
Butler	*		_	Kingscote	*		-
Caltowie	*		_	Kingston-on-Murray.	*		! -
anowie Belt	*		_	Koonibba	*	15	1
Carrieton	*		-	Koppio	*		-
Carrow	*			Kybybolite	*	17	l
Cherry Gardens	673	15	14	Lameroo	*		-
Clanfield	670			Laura	*	_	-
Clare	*		_	Leighton	*		-
Clarendon	*		_	Longwood	676-8	19	, -
Claypan Bore	*		l _	Lucindale	*	_	
Colton	*		l	Lyndoch	‡ *		-
Coomandook	670		l	MacGillivray	*		-
	*			Maitland	*		i -
Coomooroo	672			Mallala	*	7	1
Coonalpyn	*			Mangalo	*		1 -
Coonawarra	*	_	1 -		672		1 .
Coorabie	+			Mantung	†	15	1 3
Cradock	#	_	_	Meadows	+		
Crystal Brook	1	-	-	Meningie	677-9	12	1
Cygnet River	674	-		Milang	*	8	
Daver port	1		_	Millicent	000		
Dawson	*	_	_	Miltalie	666	19	
Denial Bay	*		-	Mindarie	*	-	'
Dowlingville	*	-		Minlaton	*	-	1
Elbow Hill	*	-	-	Mitchell		-	'
Forest Range	*	-		Monarto South	678	-	
Forster			_	Monteith	*	-	.
Frances	*	_		Moonta	666		1 .
Freeling	*			Moorlands	*		.
	*				663	15	

WIRRABARA (Average annual rainfall, 18.91in.).

December 18th.—Present: 19 members.

FARM AND TEAM ATTACHMENTS.—The Hon. Secretary (Mr. E. J. Stevens) contributed a paper on this subject. He said that in order to ensure the satisfactory working of teams it was necessary to provide proper harness and attachments. When working in a team on level, free land for cultivating or ploughing, the horses should be harnessed abreast, but for hilly land or sticky soil, he recommended an eight-horse team, harnessed four abreast. Swings should all be of the same length, made either of piping or light flat steel, with an extra piece riveted in the centre for additional strength. For the main swing next to the implement, the bridle swing was the safest type. Iron equalisers, about 10in. long, having a tug chain about a foot long on one end should be used in the tandem teams. team of horses was harnessed abreast to a harvester or very wide stripper the off-side swing was apt to come into contact with the crop, if it was at all high, and caused some inconvenience. This could be overcome to a certain extent by using a spider on the chains to keep them well up, and having the spreader close up to the horse's breech, thereby avoiding the necessity for having the offside swing. For harnessing a pair to a trap or trolly, the double equalising swing was to be recommended, provided that a back stop in the form of a chain or strap was used in order to prevent one horse from gaining any advantage over the other. A supply of chains and backbands should always be kept on hand. The latter were particularly useful in preventing horses from getting their legs over the traces. In reply to a question by Mr. P. J. Curnow members unanimously preferred oats to bran as an addition to hay as an economical feed for working horses.

HOOKINA, December 27th.—At the invitation of Mr. A. Henschke members with their wives and families met at his homestead to see an irrigation plant lately The water was pumped out of a well by an engine, and after reaching the surface was forced for a distance of seven chains on to a rise 35ft. above the surface of the well, where it was stored in a 5,000gall. squatter tank. was then carried down the rise in pipes, where lucerne was planted, and a sprinkler working. As the scheme was only just completed it could not yet be told whether the lucerne would be a success.

HOOKINA, January 20th.—Mr. P. Kelly initiated a discussion on the pickling of seed wheat. Mr. Madigan favored the use of bluestone. Mr. Cain thought it inadvisable to sow wheat that was badly affected with smut. Members agreed that it was better to pickle the wheat on a floor than by dipping the bags into the

MOUNT REMARKABLE, January 19th.—A programme committee was appointed to plan the meetings of the Branch for the ensuing year.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

GEORGETOWN (Average annual rainfall 18.32in.).

December 20th.—Present: eight members and one visitor.

The Specialist on the Farm.—In a paper with this title, Mr. John Wyatt suggested that a farmer having several sons should encourage each of them to pecialise in the different branches of farming operations. One most important work on the farm was the production of high-grade seed wheat. To accomplish this it was necessary to hand select from a crop a small number of heads of wheat which exhibited the best characteristics of the variety which they represented. The grain from these should be harvested and graded with a hand sieve. By repeating this operation for three years a uniform sample of seed of excellent type should be secured, and the work should be continued from year to year, in order to maintain a high standard of grain production. He had grown the same varieties of wheat in the same soil for 12 years, and the sample was better at the end of that period than it was at the beginning. Cattle required nearly as much grading as the wheat. grading as the wheat. If needed for milking, any cow that was a poor creamer should not be bred from, and only pure-bred bulls should find a place in the herd. From the sheep all weedy young ewes should be culled and sold, only breeding from

the big-framed animals, provided they carried a good fleece. Breeding mares should all be of good sound farm type, and should be mated with the best stallion available, and the foals should be given plenty of good feed when wearing, until the green feed started. A flock of poultry should be kept on every farm. The prices for eggs and table poultry had been and would still be good for some time. The turnip weed was becoming so troublesome in the district that it would require special study to ascertain the best means of eradicating it. The harvester had assisted in the distribution of its seed. Moving seemed to be the best means to check the spread of the seed; so farmers would probably find it best to cut the crop nearly ripe, and head or thrash out the corn, using the straw for fodder. The paper was commented on by members, and discussion also took place on the subject of co-operation.

GLADSTONE (Average annual rainfall, 16in.).

January 15th.—Present: nine members.

SHEEP ON THE FARM .- In a paper on this topic, the Cnairman (Mr. R. E. Lines) said that one could not but be impressed with the very small number of sheep which were kept on farms in the district during normal seasons. The present practice of alternating wheat crops with fallow would in time reduce the fetility of the soil, and it did not allow of grazing to any extent other than for a few horses and cows. He suggested that the land should grow wheat two years in every nve. Fodder crops should be substituted for wheat on portion of the farm. He had found barley more successful than other crops for this purpose. By adopting this principle, the land would be kept in better heart and kept cleaner as a result of the feeding off by sheep. He considered that the profits from one sheep in a year would be equal to the value of 10bush. or 12bush. of wheat. To obtain the best results, however, it was very necessary that farmers should keep a good type of sheep, and to maintain them in good condition. He had found the Merino well suited to the conditions of the country, and they gave little trouble. He advocated stocking the land heavily, making provision for the hand feeding of the sheep as well as the other stock. He allowed the sheep to have the run of the paddocks, while stall feeding the horses. If feed became very scarce, the sheep could be maintained by feeding chaffed hay and straw. He had carried this out in practice, and had found it profitable. It was not always necessary to provide troughing to feed the sheep, as in many cases if the grain were distributed over Mr. Sargent feared that barley grown for feeding off purposes would exhaust the land to too great an extent, but Mr. Masters, supported by other members, pointed out that when the crop was fed off the soil was revitalised by the manure which the sheep deposited. Mr. Lines considered that it was not advisable to endeavor to breed lambs all the year round as a general practice, but in occasional years, and then only when there was an abundance of feed should it be attempted. mated the rams about the middle of November, and said that tailing of lambs could be undertaken when they were from one to two months old. He considered two-tooth ewes, when well developed, old enough to breed from.

WHYTE-YARCOWIE.—Members of the Branch visited the Government Experimental Farm at Booborowie. The farm and appointments were inspected, and members expressed their appreciation of the work being done.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

TWO WELLS (Average annual rainfall, 16.36in.).

January 17th.

Mr. A. Pratt gave an account of some experiments he had been conducting with wheat during the past season and exhibited a number of samples of grain harvested from his plots. He also referred to the necessity of thoroughly pickling seed wheat.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA (Average annual rainfall, 15.22in). January 15th.—Present: 12 members and one visitor.

HORSES SUITABLE FOR FARM WORK .- In a paper with this title, Mr. T. H. Polgreen said that the neaviest horse was by no means the best for farm work. gested breeding from a heavy draught mare and a strong blood horse. From this cross a useful class of norse, capable of taking its part in any work connected with the farm, would be secured. As the resultant cross would be rather on the small side he recommended mating the fillies from that strain with a good draught As a result a horse would be secured which would be the most suitable type to do any work on the farm, light or heavy Mr. Brinkworth agreed with Mr. Polgreen and thought the lighter horse more suitable for farm work than the heavy draught. Mr. W. F. Ordor said the best cross was to be obtained from a light mare and heavy morse. Mr. T. H. Hooper preferred the Clydesdale crossed with the Suffolk Punch as a horse suitable for wagon work and for all farm work. Mr. A. B. Ferguson thought people very unwise in purchasing heavy draught mares, and giving such high prices for breeding horses suitable for farm work. not favor the type of norse with so much hair and bone, but preferred the cross The value of the draught should not be overlooked, suggested by Mr. Polgreen. for the heavy draught horse would fetch the higher price if put on the market; but for all-round farm work the lighter breed was to be preferred. Mr. C. Nankivell did not favor the crossbred, but preferred the heavy class for all farm work. Mr. J. Atkinson thought the draught horse most suitable for wagon or heavy work, but the three-quarter draught seemed to be the most useful for farm work; he himself had had great experience with this type, and found it to be the most useful.

WESTERN DISTRICT.

MILTALIE (Average annual rainfall, 14.55in.). October 22nd.—Present: 12 members and two visitors.

CARE OF FARM MACHINERY .- Mr. T. J. P. McEachen read a paper on this sub-He said that every farmer should take great care to keep his implements and machinery in good order. Each implement should be thoroughly tested before being taken into the field, in order to enable the operator to detect any errors in working. Such an implement as the binder required particular attention. It should work very easily, otherwise if it were used in a heavy crop satisfactory results would not be secured. The working of the knife should be examined to ensure that its motion was not hindered by pressure from any of the guides or fingers which might be out of position. All implements should be protected from the effects of the weather. If this was not done woodwork became warped and For the drill, a piece of material should be provided suffieventually destroyed. ciently large to cover the feed boxes, and this should be consistently used to prevent any moisture from reaching the inside of the boxes and the tubes. If steel tubes were used, and moisture was allowed to penetrate into them they would very Steel tubes should be taken off the drill each year, the quickly become useless. manure cleaned off, and after applying kerosine to them they should be well oiled and put carefully away. In discussing the paper, Mr. J. P. Story recommended the painting of implements. The judicious use of oil would prevent excessive wearing. Messrs. O. Bagnall and P. G. Wilson emphasised the need for thorough cleaning of the implements after using them. The Chairman, Mr. J. R. Jacobs, and Messrs. J. S. Jacobs, W. E. Hier, W. G. Smith, L. Aunger, and J. Bursh also took part in the discussion. Various opinions were expressed as to the most suitable kind of tube to be recommended. In reply to a question by Mr. L. Aunger, members stated that it would be more profitable to reap a fair average wheat crop for grain than to cut it for hay. Considerable discussion also took place on the question of co-operation.

YEELANNA, December 18th.—Members discussed the advantages of the harvester and stripper, as a means of handling the wheat crop.

EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES.)

BERRI.

December 15th.—Present: 23 members and one visitor.

FRUIT-DRYING.—The following paper on this subject was contributed by the Hon. Secretary (Mr. W. R. Lewis). ''My subject is so large that I fear it is not possible to do justice to it, as almost every branch would need a separate paper. However, if some of our more recent settlers gain a little general knowledge on the subject I shall feel that my time has not been wasted. When we consider the the subject I shall feel that my time has not been wasted. When we consider the strides made in the dried fruit industry of Australia since the advent of the Chaffey Bros. we must admit it is highly satisfactory, for prior to their appearance in Australia we had not done anything in the way of placing before the public a fair sample of dried fruit. It is true a few gardeners dried apples after a fashion, a few dried plums, mostly gathered from the trees dried apples after a fashion, a few dried plums, mostly gathered from the trees dried. This constituted the extent of our dried fruit industry. We relied on imports for our currants, raisins, prunes, in fact all dried fruits, and, judging by the sample received, Australia must have been a fine dumping ground for fruit not fit for the European market, as we find it to-day. Now all is changed. In almost all lines we are supplying our own requirements, and in some we are looking round in hopes of actabilities appropriate particles for the dried fruit of the future that of establishing permanent markets for the dried fruit of the future that we know we can produce in abundance, if we can only find a profitable market in the great European centres. As the only hope of capturing such a market lies in placing on that market a regular supply of high-class fruit, we must see to our drying, for on the drying ground much of our fruit is damaged to such an extent as to render it unfit for an export market. We must grow good fruit; it must be perfectly ripe; for we cannot get a good sample from poorly-grown fruit or fruit picked before it is perfectly ripe; and it is this inferior grade that finds its way on to the market and so damages the price of our better grade fruits. So that it is to our interest to have as little as possible of low-grade fruit from our drying Even if we can, by means of distilling, keep this poor grade fruit off the market, it is still better to have the higher quality; and to produce this the first requisite is good fruit, well grown, the larger the better, perfectly ripe, carefully picked, and just as carefully cut. That is in the case of our stone fruits. It may seem a small matter, the cutting of an apricot, but it is one of the steps that influence the result either for good or bad. If the knife is simply forced through the fruit, and not cleanly cut all round, the result is when sulphuring a quantity of juice is lost by oozing over the torn edge of the apricot, losing weight, and when drving a rough pointed edge instead of a smooth one. When cut place carefully on the tray upright, and do not let your fruit list to one side, as juice will waste. Place in your sulphur box or house; see that there is but little leakage of sulphur fumes, and leave in the box for at least four hours—all night will not be too long. If your house is airtight 2lbs. of sulphur should do 100 trays if left in all night; if in only four hours I would use more. In any case, I would not still replace it is about it is about its colour. not stint sulphur; it is cheap, it improves or fixes the color, and appearance tells every time. On the drying ground, under favorable conditions, five to eight days should dry them, but this is a matter ruled by the weather, and we have little the stack. If it can be arranged when picking to keep the fruit in grades of two or three sizes it will save a lot of grading on the drying ground. When the in the stack. picking is done by a family this may be done; it is simply a question of which is the cheaper, from the tree or on the drying ground. When apricots are dried the cheaper, from the tree or on the drying ground. When apricots are dried whole, they require to be well sulphured, and should not be spread on the drying ground if the sun is very hot, at least not for a couple of days, but kept stacked during the heat of the day, as whole apricots have a tendency to blister. The principal advantage in drying whole seems to be a saving in time. Your trays will hold nearly twice the weight of fruit, but will take longer than cut fruit to dry, and there is a large saving in labor in cutting. As a means of disposing of a large quantity of fruit in quick time it may be recommended; the profits prob-The method of treating peaches and nectarines is simiably are about the same. lar, with the exception of treating peaches whole. I have not known peaches to be dried whole successfully. There is a tendency to mould round the stone, so I could not recommend anyone to dry peaches whole, and in the case of nectarines dried whole I would sulphur very heavily. But I do not think peaches require to remain so long in the sulphur boxes as apricots. Some American authorities

sulphur peaches for one hour. This loosens the outer skin, which is then removed, and the peaches resulphured to fix the color. And when we think of the quantity of peaches dried there they should know something about it, for in 1899 California packed 34,800,000lbs. of peaches, and their average pack of apricots is 18,000,000 The most important section of fruit drying in California is the prune. Of tnese 174,000,000lbs. were dried in 1900 and in the Santa Clara Valley alone there are upwards of 4,000,000 French prunes, and 1,000,000 Silver and Imperial prunes. It will be some years before we touch that, but as a few prunes are being planted a little may be said on the method of drying. In California the prune is usually snaken from the tree. On the drying ground they are placed in dipping trays, immersed in boiling lye for five to 10 seconds, or until the skins crack sufficiently. The strength of the Tye is 11b. to 10galis. of water. The prunes are lifted from the boiling lye and tipped on to a draining board, after which they pass to the needle board, which has snarp-pointed needles projecting upwards in. These needles prick the skin and allow the moisture to escape more readily whilst the fruit is drying, which is mostly done in the sun, five to seven days being sufficient in favorable weather. Silver prunes are sulphured before being placed to dry. There are a few points of difference that may be noted in the method given above, and that practised by Mr. Faulkner, of Milaura. According to the Pioneer, Mr. Faulkner recommends 1lb. caustic to 20 galls. of water and immerse 30 seconds; California, 1lb. to 10 galls. of water, immerse five to 10 seconds. Mr. Faulkner dips in clean water as soon as taken from the lye; California does not. California dips and pricks prior to drying, but Mr. Faulkner claims his best results are from pricking without dipping, when nearly dry plunged into boiling water so as to wash the fruit clean, then at once dipped in a light syrup, then for a few hours spread out on trays to dry, and they are then ready for packing. I have dried a few prunes for a number of years by dipping in a solution of eaustic at the rate of 1lb. lye to 10galls. water, then spreading on the trays and drying in the sun, and have always had a fair sample. Prunes require to be sweated for several weeks, as they change considerably during this process. As prunes should some day be an important industry on this river, all experiments should be noted, so that by the time we are dealing with large quantities we shall have fully grasped all points that tend to make a good quality prune. What has been said regarding ripe fruit applies with equal force when we come to deal with currants, sultanas, and raisins. The fruit must be quite ripe, for if the sugar contents of the frum is not fully developed we cannot produce the best of sultanas or currants. Currants require neither dipping nor sulphuring, and are the simplest of our fruits to dry, the principal care being not to expose them, after picking, to the direct rays of the sun when very hot. They dry best stacked on trays or on wirenetted racks roofed or covered over. When picking, if the day is not hot, I would give the currants a few hours in direct sunshine before stacking, but if hot place The currants then dry heavier, far in the stacks or on the rack and cover up. better in color and uniformly, and do not require so long to sweat before grading. It is not necessary for me to advise in reference to erection of drying racks. There are a number on this settlement, and settlers may see them and make their own I believe the rack the best method of drying currants and sultanas, and Gordos can also be dried, and apparently with results as good as those obtained from trays. In picking sultanas be sure that your fruit is perfectly ripe, if not you lose heavily in weight. Dip your sultanas in a solution of caustic soda at the rate of about 1lb. to 18galls. to 20galls. of water. I know many recommend a much stronger dip, but if the fruit is in good order, full and crisp, this strength will crack them quite enough. Do not split the fruit, only just light cracks are neces-I have not succeeded in getting a good sample with a stronger dip than that mentioned, but I have produced a fine sample with a lye composed of 11b. of caustic to 25galls. of water. But so much depends on the judgment of the man working the dip that with a strength from which one man will turn out a good sample another man may fail. Saltanas should only be plunged in the lye and not allowed to remain, but you must be guided in this by the effect of the lye on the fruits. If the cracks show deep, dip quicker or weaken your lye. If cracks do not show, be a little slower or strengthen your lye. Spread lightly on trays or racks, and in the case of trays turn at least once during drying, which will of course vary according to weather, but about eight days of average weather will generally do. I have known sultanas dried in four days, and I have known them on the rack for six weeks. When this happens you may feel sure the quality is not the best. In racks one great advantage is the ease with which the fruit can be covered up in tne event of a storm, saving time and often in the quanty of fruit.

require sweating, as do currants and raisins. In dipping the Gordo, which is the principal grape used in raisin drying, a stronger lye is needed—11b. to Sgalls. to 10galls. of water. The process in other respects is the same, and as in the case of the currant and sultana, see that the fruit is very ripe. As we have now passed the Commonwealth requirements in respect to all fruits of the vine, all growers who plant vines must look forward to treating part of their crop at the distillery, either in the form of fresh grapes or after drying as raisins. This question is an important one, and I think one that growers should consider before planting. It is probably more profitable to place your grapes at a distillery fresh than to dry and send them afterwards; but to deal with them fresh requires a still in fairly close touch with our settlement. Another variety of fruit that our growers will have to deal with, either by preserving or drying, is the pear. In California the pear, principally Bartlett, is dried to a large extent, about 14,000,000lbs. per annum Our efforts are small compared with this, but if a good quality being packed. pear is kept on the market the demand should grow. The pears are cut in halves, spread on wooden trays, sulphured—but not over sulphured, or the fruit may be flavored by the fumes. They want good weather for drying, or loss is fairly sure to come. In dealing with the pear I would like to see preserving works, or per-One more class haps, better still, direct railway communication with the city. of fruit that we shall in time have to deal with here is the fig, and in this fruit as in prunes, we have a large Commonwealth market to supply, and we ought to be able to do it in both cases. Fig growing was one of the early industries of California, and the White Adriatic fig was extensively planted, but it was not until the introduction of the Smyrna fig and the Capri wasp that the business was placed on a safe footing and the quantity dried is steadily rising, running into millions of pounds per annum. The method employed in the case of the Smyrna (or Calimyrna, as it is known in California) is to allow the fruit to ripen until it partially dries on the tree, or shake it off. The falling extends over a period of about six weeks. It is placed in dipping baskets, dipped for about half a minute in a boiling solution containing 30zs. of salt to every gallon of water. The fruit is then spread out on trays and placed in the sun. About the second and placed in the sun. About the second day they are turned. About four days is usually sufficient to dry figs. You must be careful not to over dry, as the skins toughen. They should have a leathery feel when worked between the thumb and finger. The figs should be collected as they dry, and sweated, as this process helps to soften the skins. I dried some figs after this method in Renmark about 18 or 19 years since, and the result was decidedly good, and the fruit found a ready sale at 7½d, per lb. Now that we have the Smyrne, fig. and its foutilising ways the results should be better and the great Smyrna fig and its fertilising wasp the results should be better and the crop Figs, when ready for packing, are again dipped in a solution of more certain. 40zs. salt to 1gall. water. This washes the fruit and improves its appearance. The figs are then dried for a few hours. It is customary in packing houses to steam the figs so as to kill all grubs and eggs before packing, but I used the second dip hot, and that appeared to answer the purpose. I would like to say in conclusion that I am not pessimistic in regard to our dried fruit industry. There is not a fortune in it to the grower. What there may be for the middle man I do not pretend to know. But I hope a scheme will be evolved that will place our fruit in the hands of the consumer a little nearer the price paid to the grower than is the case to-day. But I am satisfied that we can grow and dry fruit that we need not be ashamed to display in any part of the world, and the man who will work with his own hands and use his brains will certainly make a good living and feel more independent than could possibly be the case if employed by others. We can on the irrigation areas grow fruit of almost every variety. We can grow Then surely we can every known fodder, and an infinite variety of vegetables. make a home beautiful and attractive, and we can maintain that home in comfort, and this should, after all, be the main object of every honest man. In concluding this paper and in opening this meeting for its discussion. I take the responsibility of stepping aside from the actual subject of drying fruit to offer a few words of advice in reference to the efforts being made by certain persons who are urging growers to make cash sales to them. Now I would not do this, or offer this advice, only I have been through the same thing. In the earlier days of our dried fruit industry I saw dried apricots sold at 1s. per lb. I saw as good fruit sold three years after at 3½d. per lb. Raisins fell from 6d. to 2½d. in about the same period, and sultanas from 9d. to 5d. Why? Not because there was a surplus of fruit, but because the growers had no voice in the fixing of a price for their fruits. With the advent of the Dried Fruits Act a steady improvement set in, and has continued ever since. Whatever may be its failings, its maintenance is the one hope of the fruitgrowers of Australia, and it is because we are just at present standing on dangerous ground that I hope every grower here will stand true to his union and place his dried fruit in its care for sale; a big effort is being made by a few interested persons, and by one firm in particular, to break up the D.F.A. To pass your fruit into their hands at the present juncture would be to scab upon your fellow growers, and in the long run you would be cutting your own throats. For the men who are urging you to sell for cash to them are not running their business on philanthropic lines, but are out to make money, and to make it out of you. With the D.F.A. existing you have a means of dealing with every injustice that may arise. Without it we are entirely in the buyers' hands, and that will not only be an injury to growers, but a most decided injury to consumers, for low prices to us does not mean low prices to consumers, but additional profits to the middle man. Most of you have been true to your unions in the past, do not help to undo the good work accomplished during the past 16 years by the A.D.F.A.

BERRI.

January 19th.—Preent: 25 members and one visitor.

The Hon. Secretary (Mr. W. R. Lewis) read a paper contributed by Mr. W. Miller on "Marketing of Dried Fruit." It was resolved that in order to stimulate the interest of horticultural blockholders, the Bureau offer a prize in the form of a cup, medal, or certificate to be awarded to the owner of the best kept block in the district. Messrs. V. E. Cock, F. R. Arndt, and W. R. Lewis were appointed judges, and all arrangements in connection with the judging, &c., were left entirely in their hands.

CLANFIELD (Average annual rainfall, 16in. to 17in.). November 20th.—Present: 11 members and one visitor.

RECORD AND BOOKKEEPING.—Mr. L. Orwell contributed a paper on this subject. He said that a farmer should keep a complete record of all varieties of crops grown by him. The quantities of seed and manure sown should be recorded, together with the correct yield per acre. In order to secure the latter an accurate statemen of the area of each paddock should be kept in the record book. It was advisable for every farmer to have a rain gauge on his property, as the rainfall registered at a town a few miles distant might be at variance with that registered on the farm. A large number of farmers failed to keep adequate records of their business transactions. In some cases they sought the assistance of an agent or some business person to look after their accounts; but he thought the practice should be avoided. The farmer should endeavor to keep his accounts under a simple yet comprehensive system which would enable him to make out a balance-sheet once yearly. This should be dore in the month of March each year, as the value of the harvest could then be correctly estimated. In discussing the paper members thought that a record of expenditure and receipts, accompanied by a diary, would meet the requirements of farmers.

Mr. J. Marshall read an interesting and educational paper detailing the impressions acquired by him during a journey made from Lameroo to Mildura and return.

COOMANDOOK (Average annual rainfall, 18,01in.) November 21st.—Present: seven members and one visitor.

Cropping Scrub Land.—In a paper on this subject Mr. W. T. Le Gallez supported the practice of cropping scrub land successively for three years. He said that for the first year, assuming that the virgin scrub had been rolled, springbacks cut, and there had been a good burn, it was only necessary that the land should be lightly cultivated. If there was not much rubbish left on the land a tine cultivator was much the best, and a very good seedbed could be secured. If much rubbish existed, a disc cultivator would have to be used. It was wise to drag some boughs behind the drill to cover the seed. Wheat should be the first crop in a normal season, and with 56lbs, of super to the acre, and 40lbs, of seed of a good stooling variety, the result should be profitable. In the second year if it was not possible to get a running fire over the stubble on the same land, it should be fireraked. If possible it should be ploughed after rain to a depth of 3in., and sown with 40lbs, wheat if the self-sown had not been destroyed; but if it had, then 50lbs, of seed and 70lbs, or 80lbs, or super, should be used. The yield should be

much better than from the first crop. In the third year the stubble should be broken down with a long wooden bar, to which were attached runners, to keep it off the stumps. Tied on to the bar should be fairly heavy mallee brush. That would break down the stubble very well, and on a good day (the stubble being thicker then the first year's crop) it should be possible to get a good running burn. Ploughing should be a little deeper, and the greater part, if not all, the land should be sown early with oats, about 1bush, and 80lbs, super, per acre. Wheat could be substituted for oats, but the yield would not be so satisfactory, in view of the probability of the appearance of ''takeall.'' If a good running fire over the stubble were secured, there should not be any stumps left alive. The land could then be profitably left out to grass. The same system could be followed on mallee land where the shoots prevailed after the land had been once cropped. If the shoots were stiff, railway iron would break a sufficient proportion of them to enable the firerake to scorch the remainder, and the land could be treated in the manner described, i.e. the first year ploughed lightly and sown; the second year fireraked, ploughed a little deeper, and sown; the third year a running fire and left out for pasture. It would be necessary for every settler to vary the system to suit his requirements for grazing stock; but by adopting the principle of three years' successive cropping, he would find it the simplest, cheapest quickest, most profitable, and most effective way of clearing his land of mallee.

STIRLING'S WELL.

December 18th.—Present: 11 members.

FEED FOR STOCK.—In a short paper under this title, Mr. D. Clancy referred to the difficulty of securing stock feed in the newly-settled country, and suggested that this might be overcome by cutting a large quantity of hay, preserving the wheaten chaff, sowing about 25 acres of early wheat, such as Golden Drop or Gluyas for early feed, and 20 acres of oats for spring feed. Seeding should be at the rate of about 25lbs, of grain, with about 30lbs, of manure per acre, on stubble. In an average season it was unwise to allow stock to run on wheat crops after the middle of June. Members discussed the paper. It was considered advisable to sow both early wheat and oats for feed, the wheat for winter feed, and the oats for spring. Mr. Kubank had tried this during the present season. He kept the stock on until the end of September, and then allowed both wheat and oats to mature. The crops resulted in a return of 7bush, of wheat and five bags of oats per acre.

STIRLING'S WELL.

January 15th.—Present: 16 members.

FARM HORSES.—Mr. G. S. Ridge contributed a paper on this topic. He said that the most suitable horse for farm work was the Clydesdale, which was staunch, active, and hardy. The work of a horse depended a good deal on the treatment which it received. The colt should be broken in when from 2½ to 3 years old, and he should then be placed in the body of a wagon, but without loading for him If the team was a good one, there was little doubt that he would turn out well. Every farmer should endeavor to breed a couple of foals each year, and in this connection the selection of a stallion was most important. Not only should the stallion be of a good type, but the farmer should satisfy himself that the horse had produced foals of good quality. The stallion should be thoroughly examined to ensure that he was sound, and as the head was an index of the temper of the animal, due attention should be paid to it. When weaning the foal, it should be well fed, for preference shut in a stall and supplied with chaff, bran, and crushed oats; boiled linseed was a valuable addition to the ration. Horses should never be overworked, as as soon as they began to lose condition they became Sore shoulders were frequently due to lack g collars. Bathing the shoulders with cold subject to all kinds of disorders. of condition as well as to ill-fitting collars. Bathing the shoulders with cold water after the removal of the collar was of some use, but if the trouble was at all severe, the norse should be given a spell. Horses should have a bran mash once a week, preferably on Sunday mornings, and the addition of a tablespoonful or two of sulphur to the mash would assist in keeping the blood in order. Once a month, also, a little copperas should be added to the drinking water, sufficient to color it a slight red. In discussing the paper, members suggested that in the case of a horse with sore shoulders it was better to change his collar than to alter the one which caused the sores. Often the raising or lowering of the draught on the hames would have the effect of easing the sores and allowing them to become well. It was not considered advisable to handle a colt until it was ready for

breaking in; a pet foal became too knowing to train successfully, whereas a wild colt, once mastered, was more reliable. A young horse harnessed in the body of a team would learn to work like the others, but if harnessed to a swing it might learn to baulk, and give a great deal of trouble. For a young horse which retused to lead, it was recommended to allow him to pull back until he choked down; he would not forget the lesson, and would always lead without trouble. other suggestion was to touch the colt's front legs with the whip. Opinions varied regarding the wisdom of breaking in horses with an open bridle.

> WAIKERIE (Average annual rainfall, 8.89in.). January 21st.—Present: 21 members.

Annual Meeting.—The Hon. Secretary (Mr. John C. Rowe) presented the annual report of the Branch, and it showed that 12 meetings had been held during the preceding year, with an average attendance of 26 members. A number of interesting subjects were discussed at the meetings. Two pruning demonstrations were held, and proved very successful.

WINTER IRRIGATION.—Mr. Sage initiated a discussion on this topic. were of opinion that a winter irrigation was desirable, and it was decided to take

steps to secure it.

COONALPYN, January 19th.—The Government Veterinary Lecturer (Mr. F. E. Place) attended and delivered an address, and answered numerous questions put to him by those present. In the afternoon, Mr. Place gave a practical demonstration in the treatment of horses.

MANTUNG, December 16th.—The evening was devoted to the formulation of a programme for 1916. It was decided to purchase a grader for Bureau members. It was also resolved that arrangements for a "field trial" be put in hand at an A programme embracing experimental plots and competitive work was decided upon for the coming year

MURRAY BRIDGE November 29th .- The Government Poultry Expert, Mr. D. F. Laurie, delivered a lecture before an audience of nearly 40 members and visitors. He dealt with the keeping of poultry, different breeds of fowls, and also diseases and parasites affecting poultry. Mr. Laurie answered a number of questions put to him by members of his audience.

SHERLOCK, January 1st.—Annual Meeting.—The Chairman (Mr. A. G. Schneider) presented the annual report of the Branch for the year, which showed that 11 meetings had been held, and the lectures and discussions which had taken place had proved of considerable benefit to members. The Hon. Secretary (Mr. J. C. Genders) reported having conducted a set of experiments with the idea of ascertaining the grain yield per head of different varieties of wheat, viz., John Brown, Federation, Marshall's No. 3, Yandilla King, Queen Fan, Bayah, Gluyas, and King's Red.

WAIKERIE, December 23.—Members discussed the benefits of green manuring. The practice was considered highly beneficial, the method favored being to roll as much of the crop as could be handled in one day, plough it in with a disk coulter on the plough, then disk harrow and roll.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall 27in. to 29in.).

December 20th.—Present: 10 members.

POULTRY.—In a paper on this subject, Mr. H. H. McKechnie emphasised the need for correct feeding of fowls. He recommended feeding mash, composed of one part bran and two parts pollard, in the morning, a good handful being allowed for each fowl. In the evening each bird received a small handful of wheat. the hills conditions, he recommended the Minorca fowls. They were good lavers of large-sized eggs and were, in addition, good table birds. In his experience they Lad proved much more useful for all purposes than any of the other breeds. If a bird should become crop bound an incision should be made with a sharp knife at the top of the crop, and the food in the crop pressed out. This would give relief.

ORCHARD INSECT PESTS.—Mr. D. R. Williams contributed a paper on this topic.

He said that orchard and garden pests frequently worked havor before they could be located, and it should therefore be the business of every orchardist to frequently examine his trees to detect the presence of pests. Aphides were very common in orchard and garden, and most trees and plants were subject to attack by them. Apple trees were frequently attacked by woolly aphis, which caused considerable damage to the trees. To prevent attack by this pest, apples were now worked on blight-resistant stocks. To deal with this woolly blight it was necessary to spray with sufficient force to break through the downy covering with which they were protected. In many instances it was found more effective to paint affected portions of the trees with a stiff brush. The common aphides could usually be destroyed by the application of kerosine emulsion, red oil, or tobacco wash. He referred to damage caused by bettles, and stated that generally these could be destroyed by spraying the foliage of the trees with arsenate of lead, and the limbs with tar water, prepared by boiling 11b. of tar in 50galls. water. The presence of grubs was revealed by the appearance of sawdust at the joints of the limbs of the trees. This should be cleared away, and kerosine emulsion forced into the when strawherries were attacked by bettles, the bushes should be applied to the crowns. Pumpkin beetles, which ate the pollen and the leaves of the plant, could, if few in number, be caught and destroyed by hand; otherwise spraying with arsenate of lead would prove effective. Spraying with hot tar water, or resin compound, would effect vely combat the Rutherglen bug. When potato moths appeared affected plants could be sprayed with arsenate of lead. The attack of the red spider could be met with kerosine emulsion spray. Moths in cabbages were very frequently carried out from the seed beds. The seedlings should therefore be sprayed with arsenate of lead a day or two before they were transplanted. When the cabbages were transplanted in spring or summer, when aphides were troublesome, the tops of the plants could, with advantage, be dipped into a solution of kerosine emulsion. Care should be taken, however, that the solution did not come into contact with the roots.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

December 21st.—Present: 13 members.

The annual election of officers took place, after which the annual social of the Branch was held. Included in the list of visitors, were Mr. G. R. Laffer, M.P. (representing the Advisory Board of Agriculture), Mr. A. Philps (Clarendon Branch), W. L. Summers (Blackwood), Messrs. Hughes and Blakeley (Longwood), Messrs. C. Morgan and Coats (Ironbank). A toast list was honored, and musical items rendered.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

January 18th.—Present: 14 members and two visitors.

LATE SPRAYING.—Mr. C. Ricks, who initiated a discussion on this subject, was told by Mr. S. W. Chapman that the latter practised late spraying so that in the event of codlin moth being hatched late in the season the surface of the fru ts would be coated with poison. As the fruit developed, it was best to continue spraying at intervals, especially if much rain occurred, until within the month of picking the fruit, and its eating qualities would not be impaired. It was often the late-hatched codlin moths that damaged the fruit so extensively, seeing that they most often entered the fruit in some prominent position, usually on the side, and not in the flower end, as in the case of the early moth. Members were of opinion that late spraying had a beneficial effect, inasmuch as it was a means of coping with one pest for future seasons.

FRUIT.—Most varieties now on the trees promised more than average results. Vegetables, especially potatoes, were not up to the average, as, very little rain having fallen since October last, the land was becoming very dry. Members reported the hay crop good, two to three and even more tons per acre being the

result for the neighborhood.

CYGNET RIVER.

December 16th.—Present: nine members.

Breeding and Freeding Pigs.—In a paper on this subject Mr. A. W. Miller said:—"I prefer the Berkshire-Poland China first cross, crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshire-Poland China first cross crossed with the Berkshir shire. Pigs of this type are very hardy and good doers. For next choice, the Berkshire crossed with the Essex Black is a quick maturer, but a more delicate It is not so good for bacon, carrying too great a proportion of fat to the Some breeders like the Tamworth, and I believe these pigs are very good as ers, but not as porkers, as they do not mature early. The much-talked of baconers, but not as porkers, as they do not mature early. Mid York, is too delicate a pig for a farm. It does very well on a stud pig farm, where it has every care and attention. When mated the sows should not be less than six months old, and the boar older. A young and vigorous boar is best for an old sow. There should not be more than two litters per year, March and September being the best months for the sow to farrow. Then, as a rule, it is not too hot or too cold; young pigs cannot stand too much cold, especially for the first 48 hours, which is the most critical time of their lives. The young pigs should be kept in a close sty with the mother. They should have a place made so that they can run out and back to the sow as they wish. At about three weeks old they will start to feed on a little skim milk if it is put in a shallow trough or pan near where they come out of the sty. At four weeks old they can have a little pollard, and at five weeks a little boiled grain. At seven weeks castrate the boars, and give them as much boiled grain and milk as they will eat. At eight weeks shut them away from the sow during the day time and let her have them for the night for a week. Then take them right off her at nine weeks old. they are wanted for porkers give them as much food as they can eat; never let them get hungry. If wanted as baconers they should be run in a good fenced-in paddock of two or three acres with plenty of green feed either growing or cut, and given to them with grain once a day for two or three months, when they should be ready to top up. For six weeks feed with boiled grain twice a day, and dry grain for the midday feed, and plenty of water. If at any time the pigs seem out of sorts a tablespoonful of turpentine given in fresh milk will soon put them right. This dose is for a full-grown pig, less should be given a young animal. overfeed the sow during the period of gestation, or she will become too fat; plenty of green feed is best at that time. Discussion followed.

CYGNET RIVER.

January 20th.—Present: 15 members and three visitors.

FALLOWING SOUR LAND .- Mr. A. W. Wetherspoon contributed a paper on this He said that where shoots were troublesome, land should be ploughed in August to a depth of 5in. or 6in., and allowed to remain in a rough condition, exposing as great a surface as possible to the influence of the air and the sun. Stumps and bushes should be picked up after ploughing, and in March or April the land should be cross-harrowed, the large roots should be picked up, and the ground again cross-harrowed. The seed should be drilled in in May and that operation should be followed by further harrowing. He had treated 16 acres in this way, and having sown it to malting barley, secured a return of five bags per acre of good, plump grain. Had the land been sown without thorough preparation, he said, it would not have produced anything approaching that yield, so that the extra labor required was well justified. Mr. H. T. Noske expressed the opinion that the depth of ploughing should not exceed 3in., as any greater depth was not conducive to the production of payable crops. Mr. H. B. Schaefer stated that some of his land that had been ploughed 7in. deep six years ago, had not since produced a payable crop, and grass did not grow nearly so well on that land as it did on land which had only been ploughed to a depth of 3in. The Hon. Secretary (Mr. C. T. Miller) said that the practice of ploughing 5in. deep in August would aid considerably in the removal of stumps from the land, but for actual fallowing operations he would not advise ploughing to a depth exceeding 3in., provided the land was thoroughly cultivated before seeding. Mr. Brenand reported having stripped a small crop of wheat which averaged about 10bush., and he thought that in a season like the present it would pay better to grow wheat than malting barley. A discussion followed on the relative feeding values of oaten and wheaten hay. Mr. A. W. Miller's experience had shown that horses worked better on wheaten hay, and that wheat was the best grain to feed to horses. Mr. C. T. Miller preferred oaten hay, chaffed, and if the horses had very

hard work to do, a liberal ration of crushed oats should be added to the chaff. Mr. H. T. Noske favored wheaten hay, but preferred boiled wheat to dry or crushed wheat for horses.

HARTLEY (Average annual rainfall, 15in to 16in).

December 15th.—Present: 12 members.

Horse-breaking.—Mr. O. J. Mould contributed a paper on this topic. He took as an example for treatment a colt which had been running on a station or farm from the time of castration until the time for breaking in arrived. This might be a period of from two to even six or seven years. He preferred to deal with two-year-olds, as they were more easily handled. The colt should be run into a small and convenient yard; he would not advise the use of the lassoo, as it tended to frighten the colt. A stick with a piece of hag or rag tied around the end should be used to rub all over the colt. Eventually he should become so used to this be used to rub all over the colt. Eventually he should become so used to this rubbing that he would stand it without flinching. A rope with a ring in the end should be made into a loop and put over the colt's head with the aid of the stick. A piece of cord or binder twine with a ring in the end should be put in the colt's mouth, after the fashion of a bit, bringing the end under his chin, and tieing to The rope should then be brought down from the neck, and tied to the ring under the colt's chin. This would enable the colt to be controlled with ease, and he would very quickly learn to lead. He should then be harnessed to a roller, with a crupper under his tail, and reined back fairly tightly. For this process the colt should be turned into a sandy paddock where it would not be possible for him to sustain any injury as a result of throwing himself about. The mouthing bit should be made from a plain, round, smooth piece of iron or steel about ½in. thick, and at each end bent round in the form of a ring like any other bit. A very small ring should be fitted on either end of the bit, and also a large piece of disc-shaped leather; a small strap passing under the chin should connect the ends of the bit. This bit would not slip sideways and allow the rings to get into the colt's mouth, and it would not make his mouth so raw as any other kind of bit. After the colt had walked about with the roller for three or four hours, the side straps should be unhooked and a pair of long leather reins should be passed through the rings of the bit and fastened to the roller; this would enable the driver to exercise great control over the colt. He should be taught to answer the pull of the reins promptly, and when quiet, the reins could be detached from the roller and fastened to the bit, and the colt should again be driven about and exercised in answering the reins. Mouthing was a most important matter and if it were done properly accidents and trouble in the future would be avoided. When were done properly accidents and triume in the ruther would be avoided. Then the mouthing was satisfactorily effected, the colt should be saddled up, and the rider should put his foot in the stirrup, so that the colt could feel the weight; the rider should not attempt to mount too soon, but should rub the animal's back and make the colt move along while he was hanging on to the colt's side. Next, the trainer should crack a whip over the young horse's head, taking care not to touch him with the whip, and when he became accustomed to that, the rider should mount the horse and again crack the whip on both sides. He should then proceed to a level piece of ground, a sand patch or ploughed land, if possible, and should teach the colt to walk, trot, and canter, and also to turn quickly. He should also be accustomed to the rider wearing an oilskin coat. It was also necessary to handle the horse's legs. For this purpose a hook should be used, made from a flat fencing standard bent round in the form of a hook of a suitable size to fit round the leg between the boof and fetlock. The inside of the hook should be lined with leather, and a handle should be fitted to it, making it about 3ft. or 4ft. long. The reins should be taken hold of close to the bit with one hand, and with the other the hook should be put around one of the horse's legs. After persevering a little it should be possible to lift one of the legs off the ground and hold it with the hands, and if it was rubbed and scratched the horse would very soon become accustomed to the handling of his legs. The practice of taking hold of the hair of the fetlock to lift the horse's foot should be avoided. After the horse could be ridden without trouble, he could be harnessed along with another horse and taught to pull well. Draught horses could be treated in a similar way to that described, using the same kind of hit for driving as suggested for riding. For tieing up, a bran bag should be put around the horse's neck, and the ends strapped together; a rope should be put through this, and the horse could then be tied up. He should be well rubbed about the ears and head; a horse could hardly have is head fondled too much. The writer's experience had shown that it was

a great mistake to attempt to break in colts quickly by rough treatment, as they were never such useful horses, and were easily scared by anything unusual. Patience should be exercised in the breaking in of a colt, and force should only he used as a last resource.

Farming on Small Areas.—In a paper on this subject, Mr. W. Cross said that the drought had taught farmers that they must plan their farming practice in such a way that its effects would be least felt. By growing wheat only, for the purpose of marketing, it was necessary for the farmer to employ extra labor at seed time and again at harvest time, and his income was accordingly diminished. To overcome this he suggested the growth of other crops and the adoption of dairying and the keeping of pigs and poultry. Such practice also assisted in maintaining the fertility of the soil. The paper was discussed by members, the majority of whom supported the views of the writer.

LONGWOOD (Average annual rainfall, 37in. to 38in.). December 26th.—Present: nine members and five visitors.

The meeting was held at the residence of Mr. J. Roebuck. An inspection was made of the garden, and the general appearance of the crops, watered by means of sprinklers, pipes, and channels, was very attractive. A very good crop of clean apples and pears was promised.

ORCHARD LAND IN THE HILLS .- The Hon. Secretary (Mr. J. R. Coles) contributed a paper in which he said:—''Many gardens have been planted too soon after the land has been cleared. At least 18 months should elapse before the trees are planted to allow the sweetening influence of sun, rain, air, and cultivation to affect During winter the land becomes excessively charged with water, and after a few fine days it becomes hard. Very diligent cultivation must be applied before it can be truthfully classed as arable land. Once, however, brought into good heart, or condition, it is an easy matter to keep it in good order. This characteristic is due to the retentive nature of the subsoil, and to the fine character Unless well and deeply cultivated much of the rain does not of the surface soil. penetrate to the depth appearances would lead one to suppose, but just flows over the top and is lost. The native growth in its decay adds very little humus to the soil to improve its mechanical condition. Hence the first advice to one who would establish a good orchard is to allow time and give patient effort toward bringing the soil into order before planting the trees. The first consideration after the land is cleared is drainage. Even on steep slopes some attention may be necessary, either to open gutters, underground drains, or perhaps the direction in which to throw the furrows with the plough may suffice. But each particular garden or block must be studied. If the drainage is not effective, healthy trees and fine fruit will not be produced. August is generally the best month to plant trees in this neighborhood. I usually mix 3lbs. of bonedust with the soil into each open and free. Deep cultivation and often during spring, just harrows during In the following July the land may be prepared to produce something in narrow strips between the trees. But it should be something sown in drills that will require a lot of cultivation. Stable manure and bonedust should be turned in two or three weeks before the seed is set. Suitable crops to plant between the trees are strawberries, raspherries, Jersey tree kale, broad beans, onions, tomatoes, lupins, carrots, parsnips, Japanese millet, melons, turnips, swedes, a few peas, and potatoes. At each cultivation add a little superphosphate. The growing of these surface crops, which may perhaps not yield heavily for the first year, is an inducement to energetic cultivation and indirectly in time is a great benefit to the trees, and the manure is never lost. It will be found that the trees come into bearing earlier and crop more heavily in gardens where the strips between are judiciously used." Two-thirds of the number of members present were emphatic that April and May were the best months in which to plant. Mr. Roebuck said trees planted in those early months would gain a year over those planted in August. During the winter trees made good root growth, which would be lost or checked if Mr. Blakely advanced the idea that the root system became active at disturbed. the time corresponding to the movement in the buds. the time corresponding to the movement in the buds. Members said parsnips, carrots and melons should not be planted between the rows of trees. Mr. Coles admitted having observed the fine white roots of recent growth, when he had taken them up to plant in August, but he was satisfied each year that he had planted that in his garden the ground so wet appeared sour, and by planting in August, and keeping the soil open and free during the first summer, good æration was brought about, and the trees for growth and appearance compared favorably with any around. March was the best growing month.

MILANG.

November 13th.—Present: 36 members.

REARING FAT LAMBS FOR MARKET .- A paper on this subject was contributed by Mr. S. H. Goldsworthy, who said:—"In rearing market lambs or freezers, as they are sometimes called, one of the first points to consider is the class of ewe to procure for the purpose. I favor crossbred ewes, from a Merino ewe by a Lincoln ram, or if these are unprocurable a comeback one bred from a crossbred ewe by But the crossbred ewes are preferable, as they are heavy milkers and nice quiet sheep; the progeny are early maturing, a point that is essential. It is far better to buy a good young crossbred ewe than a Merino ewe, if she costs say 7s. or Ss. more, as nive or six lambs can be taken from a ewe, and then she can be fattened for market, and the lambs would easly be worth, say, several shillings more per head each year. This was brought before my notice very prominently this season. I put in a few Merinos with the crossbreds to make up my flock, and the difference in the lambs was most marked. The two breeds of rams mostly favored and used are Dorset Horns and Shropshires. These are both early maturing, and produce a nice shaped lamb, which takes the eye when fat. breed one decides on, one should get pure-bred rams from a reliable breeder. good sheep for this purpose can be got for £3 or £4 4s., and is money well spent. It is well to choose rams with nice clean, narrow heads. Those with coarse, thick heads are likely to cause trouble with the ewes at lambing time, and it is as well to avoid them if possible. The early part of November is a very good time to put the rams in with the ewes; the lambs will then be dropped or be dropping early in April, that is if the rams start to work straight away. It is a good plan to yard the ewes and rams at night until they start to work. Of course the time of having the lambs dropped should depend a good deal on the nature of the property. instance, if one has a place where the feed comes away quickly, then have the lambs early, and if late, have them later; but for this district it is preferable to have them fairly early. One advantage in having them early is that the rough, cold, wet weather is missed at lambing, and the ground is not so cold for the young lambs to lie on. If the ewes are in real good condition when lambing, and can get a little green feed, they will keep their lambs all right, providing there is feed coming along for the colder weather, and as the lambs get bigger they soon begin to eat a little grass themselves. One of the greatest troubles to contend with is If ewes are allowed to run in a paddock where this weed is growing, in the month of April, it then being in full bloom, one stands a very big chance of losing a big percentage of the ewes. I have seen 50 ewes die in one week out of a flock of 300 through this trouble. I believe it will pay to keep them in a paddock free from this weed, even if the feed should be very short, and give them a few bags of chaff every day, or better still, a little oats or barley. I am of the opinion that it will pay to give oats to sheep at anything up to 2s. per bushel. I have been told by people who have had experience that it is well to soak grain of any kind before giving it to sheep. It is then more easily digested. It is well to give the flock attention during the lambing season. Sheep should be seen every morning at least, as lambs and ewes can often be saved that would otherwise be lost. I have found it a good plan to take out the ewes and young lambs from the flock every few days, say 12 or 15 at a time, and put them in small lots where there may be a little better picking. If they are in lots of say 30 or 40, these can be forced on early, and catch the early market. Often, in addition to returning a good price, this helps to ease the paddocks. It is a good plan to sow barley early in the season, say any time after the middle of March. This, with decent April rains, will give lambs a good start. It will be ready about the middle or end of May, and carry them on through June, when the grass is not growing very rapidly. If there is one point I would emphasize more than another it is do not overstock. If one does this one will never raise a lamb fit for market. If a lamb If there is one point I would emphasize more than I f a lamb. If one does this one will never raise a lamb fit for market. If a lamb if one does this one will never raise a lamb fit for market. If a lamb if the lamb is given by the lamb is is once allowed to get poddy all hope of making him fat is gone. It needs to be kept going with plenty of feed. If one starts with a few ewes, one will soon find out how many can be kept. It is far better to have a few too less than a few too many. Ewes and lambs are always eating, and it takes something to keep A lamb weighing about 80lbs, live weight is a good marketable

size; that will mean about 40lbs, dressed weight. I make it a practice never to send any under 70lbs. If a few are weighed one can soon form a good idea as to when they are ready to send off. If one can get in an ordinary year 14s. for a fat lamb, besides the wool from the ewes, which should be 5s. or 6s., it will be found it is a very profitable undertaking, especially if carried on in connection with growing such crops as wheat, oats, barley, &c. The sheep help to clear the land of weeds and rubbish, and also thrive much better on cultivated soils than on stale grass lands. One must reckon on a certain amount of losses with ewes and lambs, and there is always a certain percentage lost at lambing time, and, as I have mentioned, should they get stinkwort in flower it will be the means of playing havor with them. Sheep are a good, sound investment for anyone having a decent scope of country on which to run them."
members generally agreed with the writer. A good discussion ensued, in which In answer to a question, Mr. Goldsworthy stated that it was advisable to start feeding the ewes before lambing. Mr. C. Ness endorsed this opinion, and said that more attention and care should be devoted to the ewes. He always fed his when the stinkwort was in bloom.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.). December 18th.—Present: 18 members.

Hay.—A short paper on this subject was contributed by Mr. V. Braendler, who described the method of stooking and stacking hay, which he preferred. For dragging straw, he advised the use of a long iron rail or pole, which should be run over the straw on a hot day, and then dragged again in the opposite direction. Various opinions were expressed by members in regard to different methods of handling the hay crop.

MORPHETT VALE (Average annual rainfall 23.32in.). January 1sth.—Present: 10 members.

Increasing the Percentage of Lambs.—In a paper on this subject, Mr. Laylor emphasised the fact that by caring for the ewes the percentage of lambs could be appreciably increased. The rams used in a flock should be strong well developed animals, and not too old, in order to secure the best results. The ewes should be crutched about a month before lambing, but great care should be exercised in the operation, otherwise more harm might be done than good. Ewes when lambing should be inspected once each day, as a little assistance rendered to the ewe might save the life of a lamb. If an ewe should forsake her lamb, they should be placed together in a small enclosure, and by the end of 24 hours it would be generally found that the ewe would mother the lamb without further trouble. In discussing the paper, Mr. Castles suggested growing more summer feed in order to maintain the ewes in good condition.

PORT ELLIOT (Average annual rainfall, 20.33in.).

January 15th.—Present: five members.

Crors.—Members reported that grain and hay crops were good, but that red rust reduced the yield of some varieties. Federation and Western Australian Crossbred had proved good yielders. Late-sown crops had yielded best. Storms had played havoc with some of the barley crops. In view of the fact that the weather had been exceedingly dry since September crops had matured remarkably well. Mr. T. Squires reported the appearance of a disease in his potatoes which quickly caused their destruction.

IRONBANK, December 18th.—Summer Cultivation for Orchards.—In a paper with this title, Mr. R. Coats said that the orchard should be ploughed up in the spring, and after a fortnight's interval the ground should be harrowed down to a fine tilth. After each fall of rain during the summer the surface soil should be lightly cultivated to prevent the surface from caking, as if that were permitted the moisture would quickly evaporate. Judicious summer cultivation was undoubtedly very profitable.

LONGWOOD, January 22nd.—Homestead Meeting.—The meeting was held at the homestead of Mr. W. H. Hughes, and was devoted to discussion of the history, constitution, and objects of the Market Gardeners' and Fruitgrowers' Association. Samples of apples, plums, and butter beans were tabled. The afternoon

was devoted to an inspection of the orchard and garden. The Tripoli or Bush Marrow came under the notice of members. It was stated to be a good vegetable, and often profitable to market. Some wattles planted $8\frac{1}{2}$ years ago, were being stripped with very satisfactory results.

MILANG, December 11th.—Mr. O'Shaughnessy read a paper on "The Country School in its Relation to the Farmer," which was well received, and provoked a good discussion.

MOUNT COMPASS, December 18th.—The Hon. Secretary (Mr. S. Simons) initiated a discussion relating to damage caused by garden pests. During the current season onion grubs, cut worms, &c., had wrought havoc amongst the gardens in the district, in spite of all preventive measures taken early in the season.

NARRUNG, January 22nd.—The Hon. Secretary (Mr. G. R. Goode), who has enlisted with the Expeditionary Forces, was thanked for his services to the Branch, and members expressed their best wishes for his safe return. A programme of work was drawn up for the coming six months.

STRATHALBYN, December 21st.—The Chairman (Mr. W. M. Rankine) contributed a paper dealing with the wheat harvest scheme. The Branch had given attention to the matter of prevention and control of bush fires, and a committee of 10 had been appointed.

SOUTH-EAST DISTRICT.

MOUNT GAMBIER (Average annual rainfall, 32in.).

December 11th.—Present: 15 members.

HAYMAKING .- Mr. K. McIntosh read a paper, as follows: -- 'During the recent rain I visited a neighboring farmer to learn what effect the wet weather would have on his grass which had just been cut for hay. He assured me that it would take no harm, as it was lying in the swath, and the earth absorbed the moisture. riad it been raked, he asserted, the result might have been serious, as it would have had a tendency to pack together and so hold the moisure, which would cause it to rot where it came in contact with the earth. The same day I had occasion to visit another neighbor who had his grass cut and raked. Being anxious to ventilate my newly-acquired knowledge, I offered my sympathy for him in his misfortune, in having his hay damaged. 'Nothing damaged,' he replied cheerfully. 'I knew this rain was coming, therefore I hastened to get it raked; now the wind can blow through and dry it in no time, and no harm whatever will come to it. Had I left it in the swath I might have had it half rotten before it properly cured. I am sorry for those people who have got their hay in the swath, or even cocked, as it is liable to damage in either of those condi-As I had so far gained no very reliable information on the subject, I took the earliest opportunity of asking a man who had his hay cocked when the rain As the two farmers previously interviewed, although contradictory about the results in the swath and in the wind-rows, both agreed as to the injurious result from getting wet in the cocks, I confidently approached the third, intimating that the rain had served him a shabby trick by descending on his hay at the most critical time. He replied, 'You are wrong, my friend; that hay is as safe as if it was in the stack and thatched. I saw the rain coming and worked early and late to make it safe, and my efforts will result in sweet, wholesome hay, while dilatory neighbors have musty stuff not fit for stock to eat.' I am still thirsting for knowledge, and if this paper be the medium of opening a discussion on the subject of 'How to treat hay under adverse weather conditions,' it will have attained its object.'' Mr. A. A. Sassanowsky said he would certainly back the If hay was cocked it had a better chance of keeping green. swath all the hay would get wet, and would afterwards be bleached by the sun, and would lose a great deal of nutriment. In the cocks the hay would cure well, and the rain did not affect it so much. If rain were coming he would certainly try to get his hay in the cocks as soon as possible. Every farmer was satisfied that the sooner he got it into the stack the better. With 4in. or 5in. of rain he would still prefer the cocks. Mr. A. A. Kilsby endorsed this opinion, and said that when stacking he stopped when the rain came, to get some hay out cocked.

McCormick was of like opinion. Mr. H. G. Wheeler asked if the musty nature of much grass hay had a tendency to give horses a cough. Mr. J. Keegan said this was the case, and grass hay was not a very suitable feed for horses. Mitchell was decidedly in favor of putting the hay into cocks. If it were not the best then a lot of time had been wasted by farmers, but experience showed that it was necessary. In reply to Mr. McCormick, Mr. Sassanowsky said that if hay were cut in warm weather it could be put into cocks in about three days, and could be stacked in about 10 days to a fortnight after that. If they turned a cock over and found the hay brittle to the hand then they would be quite safe in putting it in the stack. Mr. McCormick said he thought the tendency for the hay to get dusty might be obviated by making the stocks narrower. Mr. G. E. Collins endorsed what had been said about cocking, and thought the dust in hay was caused through earting it too soon. Mr. H. G. Wheeler had noticed that when the grass in the hay was ripe it did not get dusty. Spear grass, when cut nearly ripe, Mr. C. E. Major thought that the dust trouble was caused came out very well. Mr. McCorby grasses growing close to the ground, or weeds, such as dandelion. mick had noticed the dust in hay from Schanck clover, and other clovers, and they could not let that ripen. Mr. A. A. Kilsby had two or three stacks of hay three pears ago, and one he had not used up until this year. It was then very handy, and eame out well. In regard to the time to stack hay he always tried it with a fork, and if it made a noise, or crackle, when lifted, the hay was fit to stack. Specimens of rape plants from Mr. G. Holloway's property at Nelson were staged.

MOUNT GAMBIER (Average annual rainfall, 32in.).

January Sth.-Present: nine members. SHEEP ON THE FARM.—The following paper, written by Mr. James Pick, was, in his absence, read by the Hon. Secretary (Mr. D. A. Collins):- 'Sheep on the farm are becoming of even greater importance than hitherto, owing to the great increase in market value of both wool and mutton—a value which will undoubtedly remain high enough to show a very substantial profit for many years to come. In the greater part of this district it will be found that the breeding of fat lambs will give the best and surest return. For this purpose the half-bred or three-quarter-bred Lincoln-Merino ewes will be the best. They are good doing sheep, Inferior and ill-shapen cut a good fleece of wool, and are excellent mothers. animals should be culled out, as it is not reasonable to expect good freezers from ill-shapen mothers. Where it is intended to dispose of the whole drop of the lambs, and the farm is situated in a locality where they can be fattened, the Shropshire ram will give good results. The lambs will be of the right shape with good backs and deep full breech—in fact, ideal freezers. If, on the other hand, it is intended to retain portion of the ewe lambs for the purpose of keeping up the numbers of the breeding ewes, or if there is a chance of all the lambs not being fattened, then the use of the Lincoln rams is to be strongly recommended, care ribs, and good deep breech. If rams of this class are used the lambs will be almost as good freezers as the Shropshire cross. Those retained for breeding ewes or any others that are unsaleable as fats, will be of far greater value, owing to the increased amount of wool gained. There are many other breeds of rams, such as the English and Border Leicester, which are excellent sheep for mutton and wool, and other mutton breeds; but they are not easily procurable at the present time. For the future, or at any rate until such time as our flocks have regained their numbers, so sadly depleted by the recent drought, every sheep farmer should save the best of his ewe lambs for breeding, and not sell them for slaughter, no matter ow fat ...ey might be. If this is not done good Crossbred ewes will become almost unobtainable in the near future. On the lighter lands of the lower South-East, where fat lamb breeding is not practicable, the first cross Lincoln-Merino will be found to be a very profitable class of sheep to keep. They give a good return of valuable wool, and in addition, a very suitable carcass for the butcher's shop. To maintain the first cross I advocate the use of the first-cross rams to be bred from large-framed plain-bodied Merino ewes, with a good length of staple and plenty of character, but not too fine, these ewes to be mated with a Lincoln ram of good shape and even quality of wool. It is very necessary to keep the ewes in good condition all the year. A little chaff or oats given when the paddocks are bare at the end of summer will pay. In addition to bringing in good revenue through the medium of wool and mutton, sheep are excellent fertilisers, and are worth more on the farm for this purpose than is generally credited to them."

Mr. J. Botterill, M.L.C., thought if they tried to find the origin of a great number of their coarser-bred sheep-Lincoln, Leicester, Dorset Horn, Southdown, and others-they would find that they had originated from a cross or two crossesthat was from a pure-bred ewe of one breed and a pure-bred ram of another. They had gone on breed ng from those two, and had perpetuated a third breed. The Lincoln had been pure, he thought, for many years, and perhaps the Leicester also, and the Merino. The fat lamb business was the most profitable with the Shrop-shire cross. His feeling with regard to fat lambs was that they required to have not less than 90 per cent. of lambs, and of that number they required to sell at least 90 per cent. If they had too many rejects on hand it would not be profitable. Other lambs did not fatten like those he mentioned. The flesh of the Southdowns and Dorset Horns was not so good. It had been proved without a doubt that a half-breed Lincoln-Merino breed could be perpetuated, and he gave instances where this had been done. The manager at Carr's plains had taken up this line of breeding. Although it might be thought a misnomer, they might call the breed produced a pure crossbred. He would get a good line of Merino ewes from the north of Adelaide, and mate them with a Lincoln ram; and on the half-breed thus produced put a Corridale ram. What he meant by a half-breed was a Lincoln-Merino cross. They could not fatten it up as profitably for a freezer as they could the Shropshire cross out of Crossbred ewes or Dorset Horns, or Southdowns. These sheep had been bred for many years for the express purpose of meat, ignoring the wool. Mr. G. H. Kilsby endorsed the remarks of Mr. Botterill, and approved the principle of keeping the best of the ewe lambs, and not the rejects, from which to breed.

LIMING LAND IN SCOTLAND.—Mr. H. Sutherland gave a short address on the methods of liming pursued in Scotland. When they intended cultivating new land they generally limed it after fallowing. They put a ton of lime on for a start, maybe two or three months before it was sown down with grain. It was then cultivated or harrowed, and left lying till seed time. Then it was ploughed again, and the seed sown. The ton of lime was supposed to do for 20 years. When the farmers had to meet the whole cost they put on, say, 5cwt. of lime just at seeding time. That would have to do for a few years. In reply to questions, Mr. Sutherland said they carted the lime—ordinary burnt lime—on to the land and put it out with shovels at first; but the sewt. per acre was put through the drill or sown by hand. He thought it would be well to lime the land in the district. He heard a gentleman say at a Bureau meeting that he had tried lime on the land, but it made no difference to the crop; but that was not a fair test for lime. Its effect was only noticeable over a number of years. Usually in Scotland they took off corn first, then turnips; and then barley. Grass seed was sown with the barley, and the land was left in grass for three years in close farming. While they let it lie in grass they would often find that the part that was limed did not bear so much grass as that which was not treated with lime; but the stock found it out, and are the herbage on the limed part to the earth before they would touch the other. They would get more milk and quicker beef off land that was limed than the other. They manure used was superphersheared and one meel. Of course the The manure used was superphosphate and none meal. Of course, the hones would keep the land better and produce better fodder; but he was doubtful whether the superphosphate would benefit the land for the same length of time. He impressed upon them that they must feed their soil to compensate for what they took out of it. He did not believe very much in special manures; he always liked to know what was in the manures. It was best to make their special manures themselves; but he did not think they could beat bones ground finely. Some farmers were shy of putting on stable manure, because they said there were a low of seeds in it. That would be easily overcome by mixing it with the lime. The lime would That killed the seeds, and made a splendid manure with sand. kill the seeds in two or three months.

SUPER. AND GRAIN.—Mr. Davidson who was absent, contributed the following notes:—"Interesting results in the use of superphosphates on wheat and oats have been achieved on Benara land. In a paddock of Algerian oats a portion was treated with 60lbs. of super. per acre. The line of demarcation was most pronunced—the oats were thicker and stood Sin. above the crop on unmanured land. Several men who examined the crop were of opinion that the manured portion would yield in grain 10bush. per acre more, and if used for chaff at least half a ton extra yield would be credited to super. An area was sown with White Tuscan and Federation wheats alongside each other, also treated with super, with the exception of a strip left as a control. Again the comparison was strikingly in favor of the artificial manure. It was heavier, taller, and better headed, and was

casily 6bush, to 7bush, an acre better. The main point demonstrated was that the Benara land, with its stiff retentive subsoil, responded readily to artificial manures, and that it would produce good wheat. As wheat had not been tried much in that direction before, landholders were pleased with the result."

NARACOORTE (Average annual rainfall, 22.60in.).

January Sth.—Present: 18 members and two visitors. Scheme for the Destruction of Rabbits.—Mr. W. G. Haynes stated that the destruction of rabbits by the poison cart was a most iniquitous method. to be a great waste that rabbits, which made good human food, should be rendered useless by poison, when so many people last year were in need of meat. Surely some system could be devised which would clear the country of rabbits—or effectively decrease them -- and at the same time make use of the carcasses for food. He admitted the professional trapper was a scourge so far as clearing the country of rabbits was concerned, but he believed he could be made use of by proper organi-When he was trapping on his land he closed up the rabbit holes, and when he went over the country again he trapped where the holes were reopened and pretty well cleared off all the rabbits. His scheme was to make the trapper do the same. Landholders could effect this by appointing a board comprising trappers, landholders, and a councillor. The district could be subdivided, and every trapper would be allotted his portion, and he could go over the country several The first once or twice he went over the country he would make first-class wages, but in order to encourage him to fill up the rabbit burrows, and clear the country of rabbits, they would have to give him a bonus, say of 1d. or 1½d per head, to enable him to make fair wages while destroying the rabbits when they were scarce. Tenders could be called from trappers for each rabbit subdi-In the summer time they could have a cool car on the railways to take the vision. rabbits to Adelaide for food, or to the Produce Depot to be frozen for export, or to the canning factory. There were a the scheme which could be easily settled. There were a number of details to be worked out in the scheme which could be easily settled. The principal point in the scheme was to compel the trapper to go over the country until the burrows were all filled up and the rabbits cleared; but it was highly necessary that to make it worth his while to do so there should be a bonus so graduated in relation to the quantity of rabbits on the land. Trappers now skimmed over the country, and took the cream of the rabbits in order to make high wages at the work, but under his proposal they would be kept to one port on of the country, and would be under contract to clear it properly. There would have to be some organisation among the landowners to subdivide the country and pay bonuses when the greatest proport.on of the rabb ts had been destroyed. Mr. Feuerheerdt said any scheme that would materially lessen them would be welcome. Many landholders held the opinion that rabbit trappers spread the rabbits over the country, and their work was not effective; so that landholders had no option but to use poison. He had no doubt that some such scheme as suggested by Mr. Haynes could make rabbit trapping effective, and at the same time utilise the careass for food purposes. Mr. McBride said that Mr. Ellis, of Benara, had some such scheme in operation. He built huts on the estates for the trappers, and when the rabbits became scarce he gave them bonuses according to their deliveries at the factory. Secretary (Mr. W. H. Smith) had had some experience of trapping and filling in burrows on his land. When the rabbits were becoming scarce for the trapper he paid him a bonus to go over the land until the rabb ts were practically eradicated. The trapper filled in the burrows and trapped at the open holes, and he found the work more enective than poisoning. The Chairman (Mr. S. H. Schinckel) said it would be very difficult to put Mr. Haynes's scheme into operation in some country, especially in the tussocky country on the plains. To make Mr Haynes's scheme effective it would require an Act of Parliament. Mr. Caldwell said they had organised poisoning under an Act of Parliament at present, and it was found difficult to get landowners to work in line under it, and he did not know whether the parliament at present, and it was found difficult to get landowners to work in line under it, and he did not know whether the parliament at present, and it was found difficult to get landowners to work any better. They had now one of the most organised trapping was going to work any better. They had now one of the most drastic Acts for rabbit destruction they ever had, and he doubted whether it was the success it should be, owing to want of unity of action. He understood that Mr. Haynes wanted to do away with poisoning altogether, and rely solely on trapping and filling in burrows, and he was afraid it would take a great deal of organization. nisation to make it more effective than the present system. Mr. Smith had told him he had tried the scheme of trapping Mr. Haynes had propounded, and found it effective. That was an illustration of where voluntary effort was more successful than organised effort under an Act of Parliament. He thought the whole

matter required careful consideration before they could express a definite opinion in favor of a change from the present system. Mr. Coad said that when a man had his land securely wire netted he could adopt the scheme proposed, but the difficulty was to induce neighbors to follow suit. Mr. Hennig said he had proved tnat trapping and filling in were better than poisoning. It was understood that Mr. Haynes would place his scheme before the members for the district with a

view to its being embodied in an Act of Parliament.

EXPERIMENTAL WHEAT PLOTS.—The Chairman (Mr. S. H. Schinckel) had reaped the experimental wheat plots that the members of the Branch inspected on his farm some six weeks ago. Those who saw the plots six weeks ago would be somewhat surprised at the reaping results, as the actual results were not in accord with the appearance of the plots when members saw them. The plots that looked as the appearance of the plots when hembers saw them. The plots that looked as if they were going to yield the best did not yield so well as some of the others when reaped. For instance, his plot with Federation wheat looked the worst when members inspected the plots, but it yielded the best when reaped. He had set it apart for the Belgium Relief Fund, and it averaged 25bush. per acre, and would return 15 bags for the fund.

As he had explained at the inspection, the plots were sown on the 4th and 5th of June with 50lbs. of seed per acre and 80lbs. of mineral The plots had harvested as follows:super. per acre.

No. 1.—Federation—1 acre 7 square chains; 42.36bush.; 25.19bush. per acre;

good quality.

No. 2.—Budd's—1 acre 7½ square chains; 41.42bush.; 23.49bush. per acre; good quality.

No. 3.—Layah—1 acre 5½ square chains; 25.50bush.; 13.37bush. per acre; very

poor quality.

No. 4.—Marshall's No. 3—1 acre 5½ square chains; 38.48bush; 26.12bush, per acre; good.

No. 5.—Lott's—1 acre 7½ chains; 39.9bush.; 22.27bush. per acre; fair quality. No. 6.—Yandilla King—1 acre 6 square chains; 37.4bush.; 23.6bush. per acre;

Federation made a poor beginning, and never looked very promising, and the eld was surprising; harvested December 31. Budd's made a good beginning, yield was surpr sing; harvested December 31. and looked very promising right to harvest time. It has a tendency to lodge; Bayah began remarkably well, and grew well throughnarvested December 31. out, but was badly affected with red rust; harvested January 1. Marshall's No. 3 began fairly well, but did not look very promising in the early spring; harvested January 1. Lott's began well, and looked very promising right through the growing period, but was slightly affected with red rust; harvested January 3. Yandilla King began fairly well, and made excellent growth right through; harvested Janu-And hade excellent growth light through; harvested salu-leary 3. He felt confident that had the spring been more favorable, the returns of these plots would have been much greater. The rainfall from time of sowing till harvesting was as follows:—June, 7.21in.; July, 1.76in.; August, 4.44in.: Septem-ber, 4.32in.; October, 1.31in.; November, 0.55in.; December, nil; total, 19.63in. Mr. Schinckel added that if there had been a good soaking rain through October the plots would have turned out much better. There was a typical winter for the South-East last year, but not a typical spring.

FLY ATTACKING FRUIT AND VEGETABLES .- Attention was directed to the appearance in the district of a fly which was attacking fruit and vegetables. was thought to be the Rutherglen fly, and kerosine emulsion was recommended as

an effective means of dealing with it. EXHIBITS.—Mr. G. Turnbull showed a sample of Yandilla King wheat which he had just reaped. It was grown in sandy country, and yielded 16bush. to the acre. Mr. A. Caldweit showed samples of wheat and oats grown by Mr. Alex. Robertson, of Struan. Among the exhibits was Frampton wheat, which had been forwarded from Ballarat for trial. The grain was plump and heavy. There was a sample of Tasmanian Giant White oats grown on his irrigation plots, which was of more than average quality. It was decided to institute a competition for the best kept farm in the district, and the Hon. Secretary was instructed to secure the necessary information to carry out the competition.

SANDALWOOD (Average annual rainfall, 13in. to 14in.).

December 10th.—Present: 10 members and two visitors.

SUITABLE WHEAT FOR HAY.—Mr. W. Willoughby read the following paper:— "The most suitable wheats for hay in this district are Gluyas, Dart's Imperial, and Marshall's No. 3. But I would sow Gluyas in preference to later wheats, on

account of it being an early variety, and gives one time to cut and cart the hay before stripping operations commence. Gluyas for hay should be sown at the rate of about 50lbs, to 60lbs, to the acre, with an equal amount of superphosphates, and it should be cut when the grain is in the milky stage. If left too long before being cut the straw becomes too coarse. Hay should be stooked within 24 hours from the time it is cut, and should be ready to cart and stack after standing about 14 to 16 days. When practicable it should be carted and stacked in cool weather, as it usually maintains the same condition in the stack that it is in when put there.'' Mr. Oakeshott preferred Silver Baart as a hay wheat; the Chairman (Mr. Hood) considered oats of more value to the farmer as hay than wheat. The Hon. Secretary (Mr. A. E. M. Lovell) thought Gluyas a good hay wheat, but preferred Calcutta Cape oats for feed purposes.

TINTINARA, October 30th.—Papers were contributed by Messrs. R. Henderson and N. Bainger on "The Farm and Garden" and "Care of the Ewe" respectively. Good discussions took place on both papers.

TINTINARA January 8th.—The Chief Inspector of Stock (Mr. T. H. Williams) attendol the meeting and delivered a lecture on "Bacteria," illustrating has remarks with lantern slides.



Shipping Wheat,

AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:— $\,$

- "Fruit Tree and Grape Vine Pruning," by Geo. Quinn (Horticultural Instructor); price, 2s. 6d.; posted, 2s. 8d.
- "Vinegrowers' Manual," by A. Sutherland; price, 6d.; posted, 7d.

Journal of the Department of Agriculture, 1s. per annum in advance; 3d. per single copy to residents of South Australia. Other places, 2s. 6d. per annum.

Any of the following bulletins and leaflets may be obtained by sending a penny stamp for postage:—

Subject.	Bulletin No.	Subject.	Bulletin
STOCK AND DAIRYING-	210.	Horticulture, &c continued.	No.
Bloodworms	II.	Peach Curl Leaf Fungus Select List of Fruit Trees Tomatoes, Production of Early	64 91 6
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THE AGRICULTURAL BUREAU.—Particulars of this Organisation, of which every farmer should be a member, can be had on application to the Department.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Agricultural Bureau Conference.

On March 10th the Conference of the Lower Northern Branches of the Agricultural Bureau will be held at Gawler. This will be followed by the Northern Yorke Peninsula Conference, to be held at Kadina on March 16th.

The Lower Eyre's Peninsula Branches will meet in conference at Yeelanna on April 3rd, and at Kalangadoo on the 12th of the same month the Branches situated in the South-Eastern Conference District will foregather.

At each of the meetings addresses will be delivered by officers of the Department of Agriculture, and papers will be contributed by members of the Agricultural Bureau.

Berseem.

The supply of berseem seed imported by the Department has met with a ready demand amongst the farmers. Intending growers of this fodder should recognise that it must be considered as a crop to be irrigated. The seed should be sown in March or, at latest, in the first fortnight in April, and it should be watered immediately to insure prompt germination.

Sowing should be at the rate of 20lbs, to 30lbs, of seed per acre, and the first cut should be taken as soon as the growth is sufficient to permit of this. Subsequent cuts should be as frequent as possible. In order to insure the best results, an irrigation should follow each cutting.

At seeding a dressing of superphosphate should be applied, and the addition of farmyard manure to the crop will do no harm.

This crop is an excellent winter grower, making headway when even oats and barley are dormant. As a green feed for poultry it is unexcelled, and all livestock take to it with readiness.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce. and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor. The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

(Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.)

"P. C. R.," Saddleworth, has a Pomeranian affected with acute eczema.

Reply—Where the disease is hereditary, as in this case, it is almost hopeless to try to cure, but if this is attempted the following treatment is most likely to benefit. Give morning and evening a 5gr. Blaud pil. cum arsen., and bathe twice daily with tr. rhus tox., 1oz., to meth. spirit 1 pint.

"T. B. B.," Clarendon, has a stallion, three years, which rubs the hair off in patches.

Reply—The symptoms appear to be those of mange, for which the treatment has been often given. It is: Stand horse in sun, wash all over with carbolic or lifebuoy soap; allow suds to dry on; a few hours later wash off with 3 per cent. coal tar solution in water, and then wipe over places with benzine one part, olive oil five parts. The treatment has to be repeated every three days for three times, then a week apart for three times. During treatment give a flat table-spoon of sulphur in food once daily.

"J. M. B.," Langhorne's Creek, has a colt, four years, which is losing condition and rough.

Reply—Probable cause, worms and teething. Try a tablespoon daily of this mixture—¼lb. each sulphate of iron, sulphur, saltpetre, gentian, 1lb. each brown sugar and linseed meal. As soon as he finishes teething he will pick up.

"R. H.," Hammond, has a mare, 16 years, with poll evil.

Reply—In a mare of this age there is not much likelihood of recovery, and if she is unable to work it would be better to destroy her. A rather delicate operation is required. Wash for an hour daily with cold water, and inject benzine afterwards, if treatment is desired.

"J. H. C.," Aldinga, had a yearling colt kicked on shoulder joint.

Reply—The symptoms are those of fracture of the humerus, and the shoulder is not dislocated, but displaced; the best treatment would be to give it a good coating of Stockholm tar and leave it alone.

"W. L.," Wynarka, has a horse which blows.

Reply—The symptoms point somewhat to broken wind. Give aconite morning and evening, water before feeding, and spell as much as possible in hot weather; green or short feed best.

"W. V. B.," Yeelanna, has a cow which fails to hold milk.

Reply—This is due to laxity of muscle closing teat. A little ointment of half beeswax and half vaseline plugged into the teat after milking will enable her to retain the milk.

"H. H. V.," Brimpton Lake, West Coast, reports the death of a grey horse. Post mortem revealed congealed blood and whitish strings in blood vessels, with abscesses in spleen. Was kicked in the flank by the driver.

Reply—The appearance of the blood vessels is technically called aneurism, and is due to the worms previously diagnosed. The abscesses on the spleen arose from a different kind of worm called *Habronema equi*. Kicking the horse's flank is a bad habit, and a driver who persisently does it deserves to lose his job. The damage to internal organs from such treatment renders them very liable to abscess formation.

"H. J. B.," Cummins, West Coast, drove a horse 25 miles. The animal blew up. It was given soda, and improved; driven next day, sweated heavily, blew up again, griped, but not violently; fell on knees and died in that position. Post mortem: Bloodworms in dung.

Reply—The trouble was acute indigestion, and the attitude before death shows that the trouble was in the caecum. Treatment in similar case—Do not drive, rub belly well, give hot stimulants, spirits, or coffee, with half a teaspoon of essence of peppermint, and repeat in an hour if necessary. This case was complicated by bloodworm aneurisms.

"J. S.," Bletchley, had a pony mare which was lively in morning, dull in afternoon and off feed, blown up with wind, dull in eye, stiff, nose and lips cold, backed, struggled, and died.

Reply—The symptoms point to over-distension of the stomach with fermenting gas, arising possibly from new hay, and acting on an over-strained organ. The symptoms are classically those of stomach distension and mechanical heart failure from pressure. In similar case give hot stimulants, such as spirits, with half a teaspoon of essence of peppermint and some baking soda, and rub flanks and belly well.

"W. P.," Kingston-on-Murray, has a mare, seven years, which damaged her near foreleg; embrocation had been applied.

Reply—The pain arises from the embrocation; turn her into a swamp and give her three months' rest.

"C. T. M.," Cygnet River, Kangaroo Island, asks the cause of a horse continually stamping.

Reply—Parasites in the heel, most probably. Try dressing the legs and heels each evening with benzine one, to linseed or olive oil five, and give a tablespoon of sulphur in the food once daily for ten days.

"H. T. N.," Cygnet River, Kangaroo Island, reports that sheep lose power of limbs and die about three weeks after shearing.

Reply—Very probably from tetanus or lockjaw, the germs of which are inoculated in the snips that occur during shearing. Shears and sheds should be thoroughly disinfected, and any cut dressed with pure carbolic acid as well as tar.

"H. H. D.," Mount Remarkable, has a pony mare with a lump about the size of overcoat button under skin of withers under harness saddle.

Reply—Probably a fibrous thickening arising from some inequality of pressure by the saddle, which had better be overhauled. The lump should be well fomented twice a day, and a little mercurial ointment rubbed in after fomenting. If neglected there is a danger of necrosis of tissue, commonly known as fistula.

Morphett Vale Agricultural Bureau reports that a cow, a few days after calving, went hard in one quarter, and lost milk of it.

Reply—Ordinary mammitis is very common after coming into milk, and this appears to be such a case. The treatment would consist of a drench of Epsom salts \(^34\)b., sulphur 2ozs., ginger \(^12\)oz., dissolved in a quart of warm beer. The udder should be well fomented with hot soapsuds twice a day, and camphor ointment (camphor 1, lard 4) should be rubbed in afterwards for as long as seems necessary.

"A. H. M.," Lobethal, reports a cow with weak and watery eyes, gradually falling away, and loss of power.

Reply—The symptoms may be those of hydatids or tuberculosis, or both, or some other parasitic disease. Owing to the possibility of tuberculosis, it would be as well to communicate with the Chief Inspector of Stock, Adelaide, or the Deputy Chief, Mount Barker, and an examination would be arranged for. In the meantime it would be well to give the cow twice daily four tablespoons of syrup of phosphate of iron in a quart of water or gruel. She would probably eat it in a mash.

"C. C. R.," Inverloch, Two Wells, has sheep afflicted with blindness and wasting.

Reply—This is another outbreak of the parasitic affection known technically as sarcosporidiosis, frequently referred to in these replies. The change of paddock is often associated with the disease, which is incubating in the paddocks that are eaten down. The treatment of boracic acid seven parts and carbonate of ammonia one part externally will help, but arsenic internally is necessary; this is most conveniently given in the form of tablets, such as Cooper's, or, if preferred, ‡oz. per sheep, equal to a dessertspoon, of Fowler's solution, may be given in the trough feed twice daily.

"L. D.," Ashbourne, had a draught mare which cut her shin in September last, and now has 6in. x 3in. lump of proud flesh, but is not lame.

Reply—It may eventually be necessary to cut off the protuberance with a broad blade, such as a red-hot shovel; but before going to that extreme it would be well to dress the part daily with tincture of iodine, and afterwards to smear it with Stockholm tar containing 10 per cent. of burnt bluestone. Also get a piece of rubber cord, such as boys use in shanghais, about 2ft. long, and wind it tightly about the fleshy part of the leg above the wound for ten minutes a day at first, gradually increasing the time to two hours. A progress report will be esteemed in a month or so, when further suggestions may be made. The mare may be worked with advantage while being treated.

"A. G. T.," Moorook, River Murray, had a draught mare which last spring, on green feed, became itchy, rubs and stamps; shoulders, throat, withers, &c., affected.

Reply—The mare has mange. Give a tablespoon of sulphur in feed for 10 days or so twice daily. Stand in sun and wash all over with soft soap; leave on to dry; then wash off with warm water and soda; afterwards dress with benzine one part, olive oil four parts. Repeat daily for three days, then twice a week for a fortnight, then once a week regularly. If not cured in a month or two, instead of benzine and oil damp the spots well and dust thickly on carbide of calcium, and let it fizz; wash off an hour or two later. For the legs put a handful in a bucket, stand the leg in, and pour in water, leaving to stand till all fizzing is over. Repeat as above.

"A. G. T.," Moorook, River Murray, also reports a heifer, six months, which is off feed, always constipated, eats rags, ropes, &c.

Reply—Acute indigestion, leading on to dry bible later. Give daily two tablespoons of syrup of phosphate of iron and a teaspoonful of saltpetre in a little gruel. Once half a pint of castor oil. Place a lick of one part saltpetre, four parts bone meal, and enough molasses to sweeten, where the calf can get at it. Green feed if possible.

"J. B. T.," Sutherlands, has a mare with swollen glands and tongue, offensive black discharge, and swelling of face.

Reply.—The symptoms point to a disease called purpura haemorrhagica, which is not catching, but the same unhealthy conditions which bring it about in one case frequently cause it to appear in others about the same time, so that it appears to be infectious. Keep on with the Condy and lard, and give 20 drops of turpentine in a little pollard on the tongue three times a day. The mare will probably take six or eight weeks to recover, but a further report in a fortnight would be esteemed, and a change of treatment suggested.

"W. O. S.," Georgetown, has a mare affected with loss of power over loins, worse early in morning; all functions seem normal, but urine is scanty; much rumbling of bowels, and does not lie down.

Reply—There seems to be kidney trouble, but this requires veterinary examination to determine. Give her morning and evening for a fortnight 10 drops of tr. rhus toxicodendron in a little pollard on her tongue, and kindly report result. It will probably be well also to rub a turpentine liniment into her loins once daily (see ammonia liniment in *Journal of Agriculture*, August, 1914).

"W. S.," Wirrabara, has a mare, six years, very lame behind, tender on stifle, and apparently damaged on back.

Reply—If careful search does not produce a nail from the foot or similar injury, it may be presumed that she fell down a creek or met with some similar accident, and possibly fractured a bone, which could only be told by examination by a veterinary surgeon. On the whole it would be well to put a good plaster of tar over the loins and on the stifle, and leave her in a good paddock where she could not slip into any sort of hole. A further report in a month or so would be esteemed.

"De la P. Bros.," Mundalla, via Bordertown, have a colt, three years, which is off feed, falling away, and stiff in hindquarters.

Reply—It would appear that after harvest the colt contracted a chill, and it is more than probable that parasites, such as bloodworms, also affect him, and his teeth, no doubt, are troubling. It would be well to mix up the following:—Carbonate of iron, 4ozs.; gentian, 4ozs.; sulphur, 4ozs.; saltpetre, 4ozs.; with sufficient honey or molasses

to make a soft, sticky paste, a tablespoonful of which should be smeared on his teeth or tongue twice daily for a fortnight or so, when a further report will be esteemed.

"W. J. J.," Cleve, had a mare, six years, in foal, which after wheat carting, contracted pain in belly, lip flapping, and off feed.

Reply—Indigestion. Rub belly well daily, and give 15 drops tr. nux vomica on tongue twice a day for 10 days. Also give 202s. Epsom salts in drinking water once a day for a week.

"F. V. L.," Kenton Valley, reports that skewbald ponies often have gripes, especially after drinking, although they can have water when they like.

Reply—Acute indigestion and impaction, following drought conditions, and probably getting too much to eat now, although the long hay is better than chaff. Give regular buggy work every day, and watch for worms in dung 1in. to 2in. long. Give salt to lick, and twice a day for a fortnight put on tongue 10 drops tr. nux vomica, and report progress.

- "J. S. S.," Yadnarie, states (a) that a medium draught mare, eight years, active, lively, always fat, passes stinking and corrosive fluid with dung, especially when on green hay; (b) mare has bruised lower eyelid.
- (a) The symptoms are those of liver trouble, probably parasitic; feed mostly bran and little pollard, with not much chaff; give twice daily in feed for a fortnight (when kindly report further) a table-spoon of the following powder:—Chloride of ammonia, sulphur, salt-petre, gentian, of each 4lb., with sugar 1lb., and linseed meal 1lb. Always water before feeding, and never feed just before work; groom well for 10 minutes daily over last two ribs on off side. (b) Blow in a little boracic acid once or twice a week. Make sure it is not a small cancer growing; if so, touch twice a week with caustic pencil.

Hartley Agricultural Bureau reports horses coughing, discharging from nose, tire easily.

Reply—Summer colds. Feed on green stuff or bran; spell from work for a few days, and give a teaspoonful each of resin and saltpetre twice a day in food for a week. Worse ones steam heads and rub liniment into throats.

"D. L. L.," Geranium, had a mare, nine years, half gone in foal, which came in lame and blown up; breathing heavily and with slight discharge from nostril; was treated correctly, but died 12 hours later.

Reply—Acute flatulent colic, such as often occurs in in-foal mares. It would have been better if, in addition to the other treatment, she

had spirits and peppermint. The worms were the ordinary bloodworms, Sc. equinum, and probably had something to do with the attack. Was it possible for the mare to have been kicked by another horse while out? If so, that was the beginning of the trouble.

Spalding Agricultural Bureau seeks information as to the likelihood of horses being poisoned by poppy seeds.

Reply—As ordinarily found, the quantity of poppy seeds in hay would not be injurious, but if in very large amounts digestive trouble might arise; if it did, a good purge with oil would be advisable, and exercise.

"H. N.," Meningie, has horses troubled with boils and sores on neck and shoulders.

Reply—Digestion out of sorts; give a teaspoonful of saltpetre, a tablespoonful of sulphur, and an ounce of Epsom salts per horse once a day for 10 or 14 days. Also apply a little daily of 2ozs, white lead and a bottleful of neatsfoot oil to the sores. Stop all corn or corny chaff for a time, and give bran instead.

"A. P. G.," Willowie, has a mare with scum on eye, red and inflamed, runs a lot, and is very painful.

Reply—As there is nothing like a prickle in the eye, the affection is probably specific ophthalmia, and will yield to the following treatment:—Keep in dark stable, hang cloth over eye from forehead band, and keep this wet with a mixture made of half a pint of water, half a pint of methylated spirits, and half an ounce of tincture of calendula. Powdered cuttlefish and such irritants are not recommended; the scum is inside, not on the surface of the eye, and it is not a case of rubbing it down as if it were a coat of paint on a buggy.

"E. P.," Hallett, has a horse, five years, which commenced stretching out and lying down, looking at flank, and walking backwards.

Reply—Impaction of the large bowels. Give a pint of linseed oil with half a pint of easter oil; rub belly vigorously and often; feed on bran only, clear hind bowel with enemas, and give 20 drops tr. nux vomica three times a day for a few days.

"J. S.," Yadnarie, had a medium draught foal, six months, which was castrated at four weeks, and now has two lumps that act like testicles, but are not the shape.

Reply—When cut a particle of tissue was left, and deformed testicles are developing, which may or may not become functionally active. It would be best to cut him again as a yearling, and cut him quite clean.

"J. S.," Yadnarie, also has a colt, rising four, with hard lump below eye, running matter.

Reply—It is probably a form of cancer; clean it well and dress daily with a caustic pencil (nitrate of silver), and kindly report progress in a month.

"J. S.," Yadnarie, has a medium draught, rising eight, with lump like a cricket ball on shoulder.

Reply—A glandular enlargement, from a bad-fitting collar. Cut it out by opening from behind at the bottom, and then dress wound with spirit of iodine. The horse may work while healing.

"W. G. B.," Farrell's Flat, has a mare which has occasional giddy fits and staggers.

Reply—The mare has what is called staggers, which probably arises from a form of tumor in the brain. Recovery is not likely, but bleeding at the time of attack would be of service, and 10 drops of tr. belladonna morning and evening for a month might do good.

Lameroo Agricultural Bureau reports the occurrence of red worms in a dirty tank.

Reply—The red worms will not hurt horses, as they are the larvae of small flies, but it is highly probable that there may be invisible worms that will do harm as well; 1lb. of quicklime per thousand gallons will throw down harmful matter, and clear the water.

"J. V. D.,"Yorketown, has mare, six years, which was very fat in summer, and went stiff. Soles are diseased at toe, and hoof seems to grow out.

Reply—Founder, or laminitis, or fever in the feet. Bleeding will not help now, although at the outset it would have done good. The soles have dropped, and the pedal bones are displaced, and the mare will never be right again, although she may be fit to work on the land and breed. The treatment has been the best possible, and should be persevered with, letting her stand in a puddle for many hours at a time. Give her 10 drops of tr. aconite morning and evening for a month. Shoeing with rocker shoes will help; they are thick at the quarters and thin at toe and heel.

"H. R. L.," Laura, has a cow which has gone hard in one teat.

Reply—It would seem that there is a constriction in the teat, and that it would be well to pass a teat syphon or clean quill up it to open it again; also rub the quarter well, after milking, with hot soapsuds.

"Rustic," Adelaide, has light horse with a large splint.

Reply—The remedy suggested, namely, rubbing with a smooth, round stick, such as a piece of broom stem, is one of the best. By inducing a flush of blood the extra lime salts are reabsorbed. A very convenient instrument for the purpose is a Japanese massage ball, obtainable at any sports depot. This and elbow grease for about five

minutes a day for a fortnight or so will generally reduce the splint. An absorbent blister has a similar effect, but often leaves a blemish.

"M. F. L.," Hornsdale, reports that horses eat dung.

Reply—This is due to acute indigestion, generally connected with the presence of worms. The best way to prevent it is to remove the dung. Failing this, try a tablespoon of the following powder twice a day in feed for a fortnight—‡lb. each sulphur, sulphate of iron, salt, baking soda, 1lb. each linseed meal and brown sugar. The dam water being very low is very apt to cause more worms to develop.

"V. P. C.," Pungonda Siding, has a filly which fell back, and carries leg, which knuckles at fetlock, big swelling on flank.

Reply—There is every probability that the pelvis has been fractured, and the swelling is lymphatic from contusion of muscles. Little can be done in way of treatment, except good feed and quiet. The swelling may be bathed with hot water with tincture arnica one ounce to the pint. A further report will be esteemed.

"J. C. G.," Adelaide, has cow which was off food and water, nose dry, always down, frothing at mouth. Post mortem—Lungs full of blood.

Reply—The symptoms were caused by blood parasites, which are injected into the circulation by scrub flies. Prevention consists in lightly wiping over the thin parts of the skin such as elbows and flanks with a rag dipped in crude fish oil, every day before turning out. Should another be attacked it would be well to give her, every day till better, a packet of dried yeast in two quarts of warm water.

"F. A.," Mundoora, reports that a horse rubs legs against rails.

Reply—The itch is due to parasites. Wash well with soft soap, leave lather on to dry for an hour or so, then wash off with soda and warm water. Dress the legs every evening with benzine one part and olive oil five parts. If the irritation is very severe put a handful of earbide of calcium in a bucket of water, and when it is fizzing well stand the leg in it for five minutes; this will have to be done once a week for three or four weeks.

"J. H. C.," Aldinga, has a mare affected with subacute colic at evening after work.

Reply—The symptoms point to some foreign growth in the caecum, probably the result of visits from bloodworm in the past. Let her drink before feeding, especially at midday, and give only oats and bran at midday. Place on her tongue night and morning for a month 10 drops of tineture nux vomica, and kindly report progress.

"P. H. R.," Balaklava, has a cow blind in one eye, which has whitish skin over it.

Reply—This is the result of an injury such as an oat husk. Make quite sure that there is nothing of the kind there now by holding the head on one side and patiently looking at the eye when the chance offers. If there is, dip a feather in castor oil, and run it over the eyeball against the hackles. If this does not remove it it will be necessary to drop into the eye 10 drops of 5 per cent. of cocame to take out the feeling, and then remove the substance with small forceps. After treatment will consist of blowing in twice a week a pinch of boracic acid; the eye will clear very slowly, taking many weeks to do so, but when it is seen to be clearing treatment may be discontinued. Thanks for note re cows; glad they have done well.

"C. W.," Whitwarta, had a mare which was ill more than a week, no pain, only nibbling appetite, sore on sides, legs stiff, eyes sinking, cough, but not frequent, slight running at nose, body very hot, urine free and good color, never lies down.

Reply—A good description of a case of pleurisy and pneumonia, most likely to end fatally. The aloes were not advisable, but the arsenic has done good. If alive on receipt of reply it would be best to place on the tongue three times a day 2½ grains of iodide of arsenic well mixed with 10 grains of sugar of milk. Liniment rubbed into the sides might help, but it is to be feared the case has gone too far. Steaming the head with a little eucalyptus once a day might also help, and the tar rag may be continued with advantage.

"J. G. C.," Warrow, West Coast, has a mare with bad itch, shoulder, mane, saddle.

Reply—The itch is a bad form of mange, and communicable to other horses by contact or using same harness, brush, &c. As the remedies named have failed, try the following, and report progress. Damp the places and dust on rather thickly carbide of calcium, repeat every three days for a fortnight, and then once a week for a fortnight, and then whenever fresh spots seem to appear. Don't smoke while doing this, or there will be trouble. Give a tablespoon of sulphur in food daily for three weeks.

"L. M. S.," Tintinara, has pigs with scabby legs.

Reply—As the animals are otherwise in good health it may be that the hot sand has something to do with it, combined with fleas and lice. Give the pigs a little sulphur, about a teaspoonful per head once a day in feed for a few days, and dress the legs with one part kerosine and four parts machinery oil; it will probably be well to give a preliminary spray with sheep dip.

"W. G. M.," Goode, West Coast, has a draught colt foal, four months, with supposed rupture in purse.

Reply—To make sure of this, throw the colt, and if the soft swelling can be returned through the inguinal ring (the slit through which the cord comes) it is a rupture. For reasons given in the article referred to, early castration now is better. The rupture would be a very serious objection to keeping him entire, as he is sure to become strangulated and die. Gut or kangaroo tendon can be obtained through any chemist, say, at Port Lincoln. Yes, there is a tendency for this weakness to be developed in members of the same family. The directions given in the article will enable you to perform the operation satisfactorily.

"T. M.," Marmon Jabuk, has a stallion with sore on skin of sheath. Reply—These chance-like sores are due to irritation of microscopic worms in the blood, and it would be well to give two tablespoons of Fowler's solution of arsenic in the feed once a day for three weeks. The local treatment will be to cauterise it thoroughly with nitrate of silver, and then to put on Venice turpentine. This treatment will be required every three days for some weeks probably.

"J. T.," Port Julia, Y.P., has a mare which was worked in treadle; went lame near fore foot, watery discharge, tenderness, and spongy swelling, shows pain.

Reply—This form of injury to the back of the foot is common with the treadle; the foot should be poulticed with bran in which a teaspoonful of carbolic acid is mixed; when all discharge ceases camphor ointment twice a day and dust with boracic acid; if proud flesh is troublesome, touch lightly with wet bluestone.

"E. H.," Port Broughton, has a cow which exhibits the following symptoms:—Excited, stamps and walks backward, red water, and swelling of milk veins.

Reply—The symptoms point to haemorrhage of the bladder, due to a parasite that infects the blood. Probably you have saved her by the treatment of nux, bryonia, and salts. It would be well to drench her once a day with the following:—Joz. each of sulphate of iron, saltpetre, and resin, dissolved in a pint of red wine. She should recover in a few days.

"R. Bros.," Koppio, have a mare with severe bruise above hoof, much pain and discharge.

Reply—So far the treatment has been quite correct, and one sulphur to seven boracic acid would make an antiseptic dressing that may complete the cure. If not, and a quittor forms, the only thing to do is to rasp the wall quite thin, then probe the sinus and open up the wall; remove any damaged tissue that may be found, and treat with antiseptics. It appears like a bad tread. The same correspondents

also report a mare kicked on the hock. Reply—It is quite possible that a couple of blisters at three weeks apart would reduce the swelling somewhat, but be careful not to apply them to the soft parts of the joint. Biniodide of mercury 1 drachm to lard 7 drachms would be enough for both applications. Plenty of elbow grease is wanted when rubbing in.

"I.," MacGillivray, K.I., has a mare unable to rise.

Reply—As no age is given, or any information as to accident, symptoms of bloodworms, and so forth, it is impossible to hazard a guess. If the following details are sent, help may be available. Age, color, class, symptoms of stiffness, or loss of power, any history of accident, body functions, normal or otherwise, feed, exposure, and, if possible, photo in act of rising.

HORTICULTURAL INQUIRIES.

RUTHERGLEN FLY BUG.

"P. C.," Beetaloo Valley, seeks a remedy for "little grey flies, which were doing so much damage to tomatoes and other fruit."

The Horticultural Instructor (Mr. G. Quinn) replies:—"I presume this query refers to the so-called Rutherglen fly bug. If so, the best preventive is cleanly tillage, as the pest breeds in grass and weeds. Smoke has been used to move them on. As a destroyer, no remedy kills them so quickly as benzole soap or benzine and soap emulsion. A formula found effective is made by boiling 4oz. to 8oz. of soap in two pints of water, then, after carrying this a considerable distance away from the fire, pour into it two pints of benzine, and churn it with a syringe or spray pump rapidly backwards and forwards from one bucket to another, until it becomes creamy. This will make 5galls. of spray. The insects may be killed with other spraying oils, tobacco wash, or resin, but these will taint ripening fruit."

THRIP AND RIDDLERS.

The Mount Compass Branch of the Agricultural Bureau asks for advice as to the best means of destroying thrip in onions and riddlers in cabbages, &c. The Horticultural Instructor states that:—

Thrips in Onions.—The most effective remedies used against thrips in Victoria and California have been tobacco and soap, and benzine emulsion.

Riddlers in Cabbage.—These, I presume, are the larvæ of the diamond-backed cabbage moth (*Plutella*). If the foliage of the plants be sprayed with arsenate of lead up to the time they reach the "heart" forming stage, these riddlers may be suppressed; but if old riddled

plants are allowed to remain in the place they will breed the pest to a destructive degree.

RED SPIDER.

The Cherry Gardens Branch sought information respecting the treatment of red spider.

The Horticultural Instructor states:—"There are two remedies used—spraying oil and lime sulphur. The former is usually applied in winter, and the latter may be applied both in summer and winter. The Californians, in their latest test, claim considerable advantage arises from mixing flour paste with the lime-sulphur solution, using it at the rate of 5lbs. of flour into a paste, and mixed into each 100galls. of spray wash. The lime sulphur, if procured ready made, should be used according to the instructions on the container. If made up in the orchard, follow the formula given in the Journal for September, 1915, pages 175-6."

AGRICULTURAL INQUIRIES.

PICKLING WHEAT.

A number of inquiries were received with respect to the pickling of seed, and in reply thereto the Superintendent of Experimental Work, Mr. W. J. Spafford, said:—

"With practically all materials used to 'pickle' seed, it is not a matter of the time that the grains are left in the solutions, but really the bringing of the spores of the fungus in contact with the solution, for if they are touched by the 'pickle' they will not germinate. If the seed wheat is very badly infected with 'bunt,' it should really be poured into the pickling solution, and stirred up so that the bunt balls are liberated from the grain, when they will rise and float on the surface. Everything that floats should be skimmed off, then the solution drained away from the grain, and the grain tipped out on to a floor and very thoroughly mixed with a shovel to break any bunt balls that were not removed in the skimming.

"No system of pickling that does not rub the grain together sufficiently well to break up the bunt balls can possibly be absolutely successful in the killing of all the spores, except the hot water treatment, which, for successful results, must be more accurately performed than is possible with the conveniences on most farms.

QUANTITIES.

"Twelve bushels of wheat will take 10galls. of water to thoroughly wet it; if the wheat is not badly affected with 'bunt' 1lb. of bluestone in this 10galls. of water is sufficient; but this can be increased to 1½lbs. with safety, depending on the degree of infection.

"There are a number of materials other than bluestone advocated as pickles for wheat, but for the farmer bluestone is a very safe method, as it is seldom adulterated. Always be sure that the crystals you buy are distinctly blue and very large, and you can rest assured that you have bluestone; the adulterant used, if any, will be sulphate of iron, which is in the form of small greenish crystals.

STRONG SOLUTION.

"If a strong solution of copper sulphate is to be used on the seed, the strength should not exceed 2 per cent. (2lbs. in 10galls. of water), and the grain should immediately be treated with linie, as described below, or else be dipped in a strong solution of common salt. Even then some of the seed will have its germinating power ruined, and so the amount of seed used per acre should be slightly increased, say, sow 65lbs. to the acre where you would ordinarily use a bushel.

USE OF LIME.

"Lime is applied to seed after pickling with bluestone to reduce the corrosive action of the copper sulphate on the germ of the grain, and so prevents it from reducing the germinating power of the treated seed. It can be either applied dry or in solution. When applied dry the quicklime must be ground to a fine powder and sprinkled on to the pickled grain as soon as the mixing with the shovel is completed. About ‡lb. to ½lb. of quicklime to the bag should prove ample. When applied in solution it should be poured on to the recently pickled heap and mixed with the shovel, as for the ordinary pickling. About 2lbs. of quicklime in 100galls. of cold water is sufficient for the purpose."

POULTRY INQUIRIES.

"B. S.," Nott's Well, states that a number of young fowls were dying, generally about two hours before sunset. A small insect was noticed between the large feathers of the wing and on the middle of the back. About a quarter of an hour before death the birds gasped for breath; post mortem, their combs became black.

The Poultry Expert (Mr. D. F. Laurie) says:—"The trouble is due to poultry ticks; those you refer to are the larval form. Dip affected birds in any of the following dips:—(1) Cooper's sheep dip—half sheep strength; (2) Formalin 2, water 100; (3) Kerosine 1 in boiling soapsuds 20 (dip when cool). Apply kerosine to all woodwork in roosting quarters."

THE LOCAL PIG INDUSTRY.

[An address delivered by the Director of Agriculture (Professor Arthur J. Perkins) at the Conference of Mid-Northern Branches of the Agricultural Bureau.]

INTRODUCTORY.

When, nowadays, I am asked to deliver addresses before Conferences and Congresses of the Agricultural Bureau, the difficulty of breaking new ground is very forcibly brought home to me. I have been at the task for 24 years, and if in earlier days I experienced some difficulty in selecting suitable subjects, I realise now that perplexities must increase in this direction the greyer I grow in the service of the State. In the end, I suppose, that like many a parson, I shall have occasionally to fall back on old sermons, in the belief that after all not many of us are gifted with long memories. To-day I propose speaking on the local pig industry, a subject on which I have not hitherto touched in public. I am therefore, in this instance, giving you the benefit of a new sermon, and I trust that the importance of the subject will make amends for any inadequacy in treatment.

THE PIG AND CLOSER SETTLEMENT.

It will, I think, be admitted that just as sheep are characteristically the type of livestock best adapted to the extensive farming of wide areas, so the cow and the pig are equally in place on the relatively small areas of closer settlement. This term—closer settlement—is in very common use with us; and I am not sure that familiarity with it has not led us to some extent to overlook its general significance. We are, I think, too apt to associate closer settlement exclusively with the splitting up of land into very small units; we too often overlook the fact that after all closer settlement is no more than a relative term. tion area, for instance, with its blocks of 20 acres to 30 acres, we rightly describe as a closer settlement area; equally true, too, is this of land under orchards and vineyards. We are, however, the nominal occupiers of enormous areas of agricultural land; and neither irrigation, nor fruitgrowing, nor vinegrowing can ever absorb more than the merest fraction of the available land. There is no gainsaying the fact, too, that at the present time over the great bulk of our agricultural territory farming is practised on the most extensive of principles; it is everywhere maximum areas under crop and minimum labor in handling them; and frequently minimum yields as a result. This is only a natural consequence of our very recent emergence from the pastoral state, and of the virgin character of much of the land that we are still subduing. Year by year, however, new land is steadily becoming scarcer, whilst our population is steadily increasing; and it cannot be long before we shall have to revise our interpretation of the term closer settlement. When the square miles of pastoral country were cut up into comparatively large farms, it was at the time rightly considered a useful measure of closer settlement. The pressure of economic conditions will, however, eventually lead to still further subdivisions; and it is then that we may count on the cow and the pig coming into their own.

THE PIG AND PRESENT DAY FARMING.

Now, this reference to the pig as an animal adapted to closer settlement conditions than at present obtain, does not imply its exclusion from farms as at present constituted. In fact, I am prepared to state, that given favorable market conditions, to which reference will be made later on, there are few grain farms in the State that could not carry pigs advantageously, were there never a cow within miles of the home-It seems unnecessary at this stage to emphasise the great value of the pig as a revenue producer; how, at very little cost, this animal converts offal and waste products into valuable flesh. facts are realised by most of us; the marvel is that they are not taken more full advantage of. We are proud, and rightly so, of the general progress of our agricultural industries; in making our boast of them, however, we must try and forget that the pig industry to-day is in no better position than it was 30 years to 40 years ago; indeed, if anything, it may be said to have retrograded. Let us see what statisfical data have to say on the subject. Below, in Table I., will be found stated the number of pigs present in the State since 1879:-

Table I.—Showing Pigs I	t resent in	the S	state sv	nce 18	79.
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Years.	Pigs.	!	Years.	Pigs.	Years.	Figs.
1879	90,548	1	1891	81,948	1903	88,246
1889	127,126	i	1892	61,180	1904	111,497
1881	120,718	1	1893	86,418	1905	117,886
1882	100.015	1	1894		1906	111,240
1883	108,714	1	1895		1907	90.741
1884	163,807	1	1896	59,479	1908	78.454
1885		i	1897	46,894	1909	
1886	participan.		1898	60,132	1910	96.386
1887		1	1899	82,901	1911	93,130
1888	-	i	1900	89.734	1012	69,832
1 889	106,856	1	1901	88.886	1913	64,119
890	116.277		1902		1914	

PROGRESS IN AGRICULTURAL INDUSTRIES, BUT STAGNATION IN PIG INDUSTRY.

Now these figures are not very edifying for a country that has in other directions made rapid strides in agricultural development. Let us realise the fact that in 1884 there were 100,000 more pigs in South Australia than 1913. In 1892 the number of pigs present were practically the same as in 1913, i.e., 22 years later. I happened to have come out to Australia in 1892, and have therefore been an interested spectator of what progress has been made since then. For purposes of comparison I have contrasted agricultural returns for 1892 and 1913 respectively in Table II.

Table II.—Showing Comparison of Agricultural Returns in 1892 and 1913.

			Percentage
	1892.	1913.	Increase.
Population	331.721	440.047	+ 32.664%
Under cultivation	2.625,741 acres	4,769,459 acres	+ 81.64%
Under wheat	1,520,580 "	2,267,851 "	+ 49.1%
Under barley	13,285 "	90,552 "	+ 581.61%
Under oats	15,745 "	116,932 "	+ 636.31%
Under pease	4,705 "	8,997	+ 91.22%
Under hay	434.116 "	568,550	+ 30.97%
Under potatoes	6,014 "	10,809	+ 79.73%
Under orchard	9.918 "	24,426	+ 146.23%
Under vines	15,418 "	26,208 "	+ 69.98%
Under fallow	567,878 "	1,569,623 "	+ 176.81%
Wheat yield	9,240,108bush.	16,936,988bush.	+ 83.30%
Barley yield	175,468 "	1.332,714 "	+ 659.52%
Oats yield	166,489 "	1,200,740 "	+ 621.22%
Pease yield	69,922 "	108,505 "	+ 55.18%
Hay yield	389,277 tons	571,616 tons	+ 46.84%
Potatoes yield	20,057 "	32,950 ''	+ 64.28%
Wine yield	594,038galls.	2,759,665galls.	+ 364.56%
Horses	186,726 head	283,641 head	+ 51.90%
Mileh cows	79.420 "	107,879 "	+ 35.83%
Sheep	7,152,047 "	5,073,057 **	- 29.07%
Goats	8,222 "	9,534	+ 15.96%
Pigs	61.180 "	64,119 **	+ 4.64%

The progress achieved during these 22 years is, I think, very real; and picking out a few of the chief items, we notice that our population has increased by one-third; our total area under cultivation by four-fifths; our area under wheat by one-half; our orchard area has been nearly trebled; our vineyard area nearly doubled; horses have increased by one-half, and milch cows by one-third. In the meanwhile pigs have remained practically stationary; even goats show a higher rate of increase. True, sheep have decreased to the extent of 29 per cent.; theirs, however, is a special case—vast sheep runs cut up into farms, whose owners have not yet realised that it is possible to farm the land and still carry as many sheep as the old runs. But pigs, the most typical of farm livestock, have made no progress whatsoever, notwithstanding the vast extension of our farming operations.

Causes of Stagnation.

It seems important that we should endeavor to ascertain why pigs continue apparently so unpopular with South Australian farmers. They are popular and rent-earning in other countries; why is it otherwise here? I attach importance to this question and its solution, because in my view one of the points on which the success of closer settlement is likely to hinge is the profitableness or otherwise of the pig industry.

I am, of course, aware of the objections that are in present circumstances raised to pigs on the farm; profits on their upkeep are said to be far too speculative in character; to be, in fact, very easily converted into losses. Values paid for pigs on the local market are said to be either phenomenally good, or else more or less unremunerative; hence in the matter of pigs, we are intermittently faced with famine or plethora. Now, if this be a fair statement of the position—and within certain limits I believe that it is—it would in any business be considered very unsatisfactory; and I am afraid that until the economic conditions shall have been radically changed we cannot expect progress in the local pig industry.

Whether within recent times the local pig market has been as fluctuating as is alleged can be roughly tested by an examination of the average prices realised in Adelaide, and published by the Government Statist since 1906. I have summarised these figures below in Table III.

Table III.—Showing Average Prices Realised by Pigs on the Adelaide Market, 1906-1914.

		C	gon	PERS.		E	AGO	ners.			Por	KIGRS.		
Year.		/era		Price per Lb. on Basis 375lbs. Live Weight.		ver Pric	nge	Price per Lb. on Basis 160lbs. Live Weight.		ver Pric	nge	Price per Lb. on Basis 80lbs. Live Weight.	Pri W	erage de of heat. per ishel.
	£	ε.	đ.	d.	£	s.	d.	d.	£	8.	d.	d.		d.
1906	2	12	0	1.66	1	19	0	2.92	1	4	0	3.60	3	2
1907	4	11	6	2.93	2	12	10	3.96	1	8	0	4.20	3	8
1908	4.	12	0	2.94	2	17	0	4.28	1	15	9	5.36	3	103
1909	4	7	6	2.80	2	16	6	4.24	1	18	9	5.81	4	5
1910	3	17	6	2.48	2	13	0	3.98	1	13	0	4.95	3	81
1911	3	6	0	2.11	2	9	0	3.68	1	11	0	4.65	3	41
1912	4	2	4	2.63	3	1	2	4.59	1	14	11	5.24	3	10
1913	6	4	2	3.97	3	12	6	5.44	2	4	11	6.74	3	$6\frac{1}{2}$
1914	7	0	0	4.48	3	2	6	4.69	2	1	6	6.23	4	11

Figures given in Table III. represent average prices for the whole year, within which very wide variations may have occurred; nor, indeed do they cover a period sufficiently extensive to justify definite conclusions. Nevertheless, we may notice that within a period of nine years baconers, which may be taken to represent the average marketable pig, have varied from below 3d. a pound to close on 5½d. This is a very wide variation, representing about 50 per cent. of the value of the animal and about £1 on a pig going 160lbs. live weight.

There is, moreover, a rough test enabling one to judge whether on examination of ruling prices, pigs can be reared at a profit on grain And since for the present we have grain farms mainly in view, this test should prove interesting if applied at the present juncture. Roughly speaking, pigs fed on corn meal make about 1lb. increase in live weight for every 5lbs. of corn meal consumed. Now, whilst I do not wish to infer that wheat is the cheapest type of grain that can be fed to pigs, we are justified in this instance in adopting it as a standard, since of all grains it is the most abundant on South Australian farms; and in the form of damaged or inferior grain is always available for feeding purposes. Hence, side by side of average prices realised for pigs, I have in the last column of Table III. indicated the average prices realised for wheat between 1906 and 1914. view, however, to emphasising further the position I have indicated below in Table IV., the value of 5lbs. of wheat contrasted with the average prices realised by baconers per lb. live weight.

Table IV.—Showing Average Prices per Pound Live Weight Realised by Baconers, Contrasted with Average Value of 5lbs, of Wheat.

	Year.	Average Price per Lb. Live Weight of Baconers. d.	Average Value of 5lbs. of Wheat.
1906	***************************************	2.92	3.17
1907		3.96	3.67
1908	*************	4.28	3.87
1909	• • • • • • • • • • • • • • • • • • • •	4.24	4.42
1910	***************	3.98	3.71
1911	* * * * * * * * * * * * * * * * * * * *	3.68	3.37
1912		4.59	3.83
1913	*	5.44	3.54
1914		4.69	4.13

We may readily agree that it is not good practice to feed any kind of livestock on one type of food alone. It will be clear, nevertheless, from Table IV., that neither in 1906 nor in 1909 could pigs be reared at a profit on wheat; and since it is a matter of common experience that in normal times the prices of other foodstuffs follow more or less

closely that of wheat, we may infer that in both these years pigs were probably more or less unprofitable. Facts like these would tend to explain the state of stagnation into which the local pig industry has fallen. And if, as I believe, the next step in closer settlement which must eventually come to us is more or less intimately bound up with a prosperous pig industry, it behoves us to see whether steps cannot be taken towards modifying this unsatisfactory economic condition.

SMALL LOCAL CONSUMPTION AND ABSENCE OF EXPORT TRADE CAUSE OF STAGNATION.

It is on the whole not difficult to realise why, in the circumstances, the local pig industry should have continued so long in a state of stagnation. We are, after all, only a small body of people, and our immediate food requirements in any particular direction are comparatively easy to satisfy. Let us ascertain what they are in the matter of pork. According to the Commonwealth Statistician we consume from 10lbs. to 11lbs. of bacon and ham per annum and per head of population; or with our present population the equivalent of about 36,000 baconers per annum. In addition to this, I find that in 1913 between 32,000 and 33,000 pigs were slaughtered for fresh pork. Hence our total requirements appear to be represented annually by 68,000 to 69,000 pigs; or almost exactly the number at present to be found in the State.

This, then, is the position in a nutshell: So long as the number of pigs in the State correspond approximately to local requirements, prices will rise and fall, both with the prices of available foodstuffs and with those of other meats. But so soon as these requirements are exceeded, prices fall, and pigs become drugs on the market. The position of lambs, of butter, of apples, &c., was exactly similar, until they were rescued therefrom by a wisely developed export trade. And in my view stagnation in the pig industry will continue, and to that extent closer settlement will be hampered, until adequate steps are taken to open out a reliable export trade.

GREAT BRITAIN AS AN IMPORTER OF PORK.

It is, of course, not sufficient to advocate vaguely the export of produce of any kind. One should be in a position to show that openings for the absorption of such produce exist in other countries. In such questions, as a rule, we are accustomed to look towards Great Britain, whose absorption in manufactures leaves very largely to others the production of essential foodstuffs. Hence, I have summarised below in Table V., the average importations into Great Britain calculated for the five years preceding the War, 1910-1914.

norts of Cured Pork into Great Britain. 1910-14 É

		BACON,			Нам.		Отн	OTHER SALTED.	
Country of Origin.	Quantities,	Values.	· Se	Quantities.	Values.	es.	Quantities.	Values.	es.
		Total,	Per Lb.		Total.	Per Lb.		Total,	Per Lb.
	Cwts.	વર	ď.	Cwts.	4 -3	d.	Cwts.	(+)	d.
Russia	166,882	506,345	6.50	1		1	1		1
Sweden	54,934	178,455	96-9	1	1	1	1	1	1
Denmark	2,256,993	7,933,984	7.53	2,094	7,675	7.85	186,284	180,360	2.08
Holland	132,566	450,263	7.28	1		1	1.	1	1
Servia	8,570	25,160	6.29	2,314	8,082	7.48	1	1	I
United States of America	1,629,886	5,172,788	08.9	781,689	2,612,414	7.16	41,462	99,753	5.15
Canada	400,190	1,301,342	6.97	64,702	224,329	7.43	1,286	3,110	5.18
Germany	1	ı		932	3,512	8.07	1	I	I
Other countries	14,419	44,600	6.63	1,396	5,168	7.93	6,712	9,859	3.15
Totals	4,664,440	15,612,937	7.17	853,127	2,861,180	7.19	235,744	293,222	2.67
Grand total		5,753,311ewts.	53,311cwts	:	£18,767,339	e			

In one form or another, therefore, Great Britain, prior to the War, was importing annually close on 300,000 tons of cured pork, of an average value of over 18\frac{3}{4} millions sterling. Hence we have in the home country a vast importing centre which we could supply—partly at all events—had we the material to trade with.

It may, perhaps, be argued that we are not in a position to compete with other countries in this particular line. Personally, however, I refuse to believe that such should be the case. Essential raw materials and foodstuffs are as cheap here as anywhere else in the world; nor can labor conditions be said to be more difficult in the Commonwealth than in Canada or in the United States, both of which in combination supply more than 50 per cent. of the cured pork imported into Great Britain. Hence, notwithstanding our handicap of distance, if average prices of 7d. to 8d. a pound could induce these countries to build up a great export trade, I see no reason why we should not be able to follow in their footsteps. It may be added that prior to the War the cost of freight in cool storage of bacon and ham to Great Britain was §d. per lb.

COMMONWEALTH EXPORTS OF BACON AND HAM.

In this connection it may be pointed out that if South Australian exports of pork are practically nil, this is not altogether the case in so far as the Commonwealth is concerned. Hence in order to enable us to realise what is being done in this connection by our neighbors. I have summarised below in Table VI., the Commonwealth exports of bacon and ham for 1913.

TABLE '	VI.—Showing	Commonwealth	Exports o.	f Bacon	and Ham	in 1913.
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The state of the s			
Country of Destination.	Quantities, ewts.	Total.	Per Lb.
United Kingdom			
United Kingdom	6,528-5	20,958	6-88
Phillipines	4,242-5	21,758	10.99
East Indies	1.815.4	10,307	12-16
Pacific Islands	1,108.9	6,187	11.95
Straits Settlement	994.3	5,410	11-66
Hongkong	538-4	2,818	11.21
China	486-8	2,678	11.79
Papua	404·1	1,984	10.52
India	101.6	530	11.17
Kaiser Wilhelmland	98.7	598	12.98
New Zealand	79.7	228	6.13
Mauritius	50.7	302	12.76
Other countries	41.1	224	11.69
Totals	16,490.7	73,982	•
Exported by.			
New South Wales	3.005.0	12,626	
Victoria	554.4	3,038	
Queensland	12.922.5	58,277	
South Australia	5.9	22	
Western Australia	2.9	19	
	4.0	19	
Totals	16,490.7	73,982	

Thus, then, of bacon and ham the Commonwealth exported in 1913 about 825 tons, having a value of close on £74,000; in which total South Australia's contribution was about 6cwt., equivalent in value to £22. It must be acknowledged that the Commonwealth exports of bacon and ham, even taken as a whole, are very far from imposing. Local patriotism might have checked me from exposing the South Austrahan position, but for the fact that I hope for better things in the future. The fact, moreover, that about £21,000 worth of bacon and ham was shipped to Great Britain in 1913 by neighboring States, should be of good augury to us. It will serve to prove, at all events, that should we attempt to force our way on to the British markets, we shall not have to follow an altogether uncharted route.

FROZEN PORK.

It has been suggested, I know, that pork, like mutton and lamb, might with equal advantage be exported in the frozen state. Indeed successful attempts in this direction have already been made by the other States. I append below, in Table VII., results in this direction of 1913 exports for the Commonwealth.

Table VII.—Showing Commonwealth Expors of Frozen Pork in 1913.

Countries of Destination,	Quantities.	Total. £	$\Pr_{d.}^{\text{Der Lb.}}$
Philippines	834.9	2,097	5 ·38
Straits Settlement		1,531	6.35
Ceylon	225.8	729	6.92
Egypt	$212 \cdot 3$	568	5.73
United Kingdom	106.0	246	5.00
Papua	0.9	3	7.42
Other countries		85	7·46
Totals	1,921.2	5,259	
Exported from,			
New South Wales	1.090.6	3,061	
Queensland		2,198	
Totals	1,921-2	5,259	

Table VII. shows exports of frozen pork to be as yet inconsiderable—not 100 tons, valued at a little over £5,000 in 1913—nor do I believe that frozen pork is ever likely seriously to compete with the export of bacon and ham. But should this be the case, it would then become an additional factor in the progress of the Commonwealth pig industry.

SUMMARY REVIEW OF THE ECONOMIC POSITION.

At this stage I think it well to summarise the position as I see it, and as I have been endeavoring to put it to you. We are fast reaching a stage in our agricultural development when a new step in closer

settlement will become a pressing necessity to us. Now, economic changes of all kinds are generally painful in their incidence on some individuals; sufficiently so at times to mask for the time being their beneficial tendency. Hence, if anything can be done to facilitate the change which is impending it will be greatly to our advantage. dairy farming and the pig industry lend themselves well to more intensive types of farming than we are in the habit of practising; and had their present local position been satisfactory we could have unreservedly depended upon their aid in any steps of closer settlement of the near future. Unfortunately such is very far from being the case; and unless we can succeed in bringing about a change, the success of the next stage in closer settlement is likely to be temporarily compromised. To-day I am concerned exclusively with the pig industry; and I have shown that for the past 40 years it has not risen above supplying more or less well the meagre requirements of our small population. This has meant a regular succession of hysterical and depressed markets, resulting in general stagnation in the industry. be recommended to take up pigs seriously in present conditions; nor can they do so, in my opinion, until we have laid broad and wide the foundations of our export trade. It remains to be considered, of course, how such a trade can be established to best advantage. this particular point I cannot pretend to speak as an expert, nevertheless I shall hazard a few suggestions which general personal observations lead me to believe would meet the case.

IMPORTANCE OF QUALITY AND UNIFORMITY FOR EXPORT TRADE.

Now, when one aims at regular exports, first and foremost one must consider one's ability to supply the market with an acceptable article. I have already shown that the neighboring States—to a limited degree it is true-have been able to sell bacon and ham in Great Britain at quite reasonable figures; and what they have done there appears to be no reason why we should not be able to do also. In this connection it is necessary to draw attention to the fact that uniformity in quality and type is absolutely essential to success in any export venture. must not expect for bacon and ham the hearty welcome and the open doors we are accustomed to in our exports of wheat, wool, apples, &c. The latter are well-known natural products differing but slightly in type and character; whereas the former are manufactured articles, excellent at times, perhaps, and at others not very suitable for human consumption. And if we wish to get a firm and profitable grip of the British market none but the primest of bacon and hams should ever be Poor or even indifferent or uneven samples would condemn us definitely to a low average of probably unprofitable prices, and for

the time being ruin our attempts at building up an export trade. England it is, or was, customary to praise farm-cured ham and bacon: and probably with good reason in those localities in which successful curing has in the course of time become an inherited art. I do not wish to depreciate the efforts of local farmers in this direction; there are rashers of bacon of their own curing which I can recall with pleasure; there are others, too, which I would rather forget. We are not. however, concerned solely with quality; for, if the latter is essential. aniformity is even more so. It is, in fact, better from the point of view of export trade that all the bacon should be uniformly moderate in quality, than that some of it should be very good and some of it very And quite evidently no degree of uniformity can be secured if there are as many curers as owners of pigs. Hence, in my view, the very first essential to success in the export trade is the creation of large, well established, centrally situated modern bacon-curing factories throughout the State.

STATE ACTION NECESSARY.

I quite foresee the difficulties likely to confront this proposal We come face to face with a vicious circle which it is exceedingly difficult to avoid. On the one hand, there is the refusal to create factories until a sufficiency of pigs are available; and on the other the refusal to rear the pigs until the factories are erected. This is the natural position from the point of view of the transactions of private individuals; they refuse to incur risks merely for the sake of the expan-The State, however, in its representative sion of a national industry. character is otherwise situated. If it be the considered opinion of those best able to judge that the expansion of the pig industry is a subject of national importance, the State can step in and break through the vicious circle, and thereby render possible profitable exports.

There are many directions in which Government assistance could be given with this object in view; and I do not know that I am called upon to dictate any particular line of action. I might suggest, however, that as was done many years ago in the case of the export of butter, an attractive bonus might be offered for a period of years on all first-class bacon and ham exported from the State. Some action of this kind would probably prove an incentive to the erection of new factories. In addition to this, special inducements might perhaps be offered towards the erection of local co-operative factories. And, finally, should it be necessary to do so, the Government could establish State factories in various centres, on the understanding that these fac-

tories would be handed over at cost price to co-operative societies that might be formed locally. Naturally, too, the services of the London Trade Commissioner would be availed of to push along sales and to advise on handling, &c.

We have long been accustomed to the wails of those who decry any form of Government interference in trade and industry; and should these schemes materialise we shall no doubt hear their voices again. Very likely the pioneer Government factories will not prove financially successful; indeed were financial success in this direction highly probable there would be no call for Government interference. Whatever the financial results of Government attempts in this direction, they would nevertheless be amply justified if they should succeed in opening up a profitable export trade in bacon and ham. And I see no other means of doing this within a reasonable period of time.

SOME POINTS IN MANAGEMENT.

When I first set about preparing this paper, I had intended dealing to some extent with general management and handling of pigs. I realise, however, that economic questions having reference to the industry have absorbed the greater portion of my time. I do not regret it, however, since I feel that I cannot conscientiously recommend pigs to anybody until general conditions are altered on the lines I have indicated. There are, however, a few general questions on which I should like to touch before sitting down.

There are pigs of various kinds—some good, some bad, and some indifferent—and I am afraid we have all of them in our midst. I have already insisted that bacon and ham are manufactured articles, dependent for their quality on the skill of the curer. This is true up to a certain point; but the best of us cannot make a silk purse out of a sow's ear. In other words, if we ever come to a regular export trade, the factories will insist on first class raw material, and there will, at first at all events, be many rejects in the land. This quality of the pig will depend on two points, his breeding and his feeding; and to these two points I wish to speak briefly.

THE BACON PIG.

The success of the local pig industry, if it is to expand, will, I think, depend on the adoption of what is known as the bacon pig, as distinct from the American lard hog. This is an animal with a long, deep careass, well developed sides, good hams, with light shoulders and neck. The good baconer is a relatively narrow pig, and does not readily put on fat to excess. The modern demand is for lean, streaky bacon, and not for excessively fat bacon, as was formerly the case.

This type of pig can be secured from several sources so far as breeding is concerned. As a rule, any properly handled well bred pig will develop into that type between eight to 10 months. In the matter of breeds we are restricted locally to Berkshires, Yorkshires, Tamworth, and large blacks. Personally I have for a number of years had to handle Berkshires, and am in consequence perhaps biased in their favor. I admit, however, the value of the other breeds, although I think Berkshires are better adapted to local conditions.

But whilst personally I like pure breeds, and pure breds must in the general interests be reared by some of us, I believe that for the average farmer a judicious cross is the safest. In this direction a White Yorkshire boar on any other type of sow gives excellent results, but for the fact that he stamps his color on his progeny, which are thereafter more liable to sun scald than those of darker coloring. Hence generally I would recommend a Berkshire or Tamworth boar. It should not be forgotten that on no consideration should the boar be anything else than pure bred, and of the best type that one's pocket can afford to secure.

The sows should be the best procurable; crossbred even, at a pinch. And if the latter, the influence of the boar might be used to improve the type of crossbred sow used. Above all, with pigs more than any other type of livestock, in-breeding must be avoided. Hence, frequent changes of boar are desirable when sows of one's own breeding are handled.

HANDLING.

If they are to be profitable, growing pigs should never be stinted in their feed requirements. It is better to destroy a stunted, ill-grown pig than to attempt to fatten it. The mother, while on the litter, should be liberally fed; and similarly the young weaners when taken off their mother. An abundant supply of skim milk is very useful at this time; and failing this plenty of thin gruel. Young pigs will not fatten quite as rapidly, but will make infinitely better quality flesh if given the opportunity of plenty of exercise in early stages of their development. They are better off running about in small yards or fields than confined to sties, however well built. They should, however, be brought back to the latter for topping up.

The local market likes becomers dying at 120lbs, to 130lbs, chiefly because the smaller sides are more easily cut up and disposed of locally. These represent live weights of 150lbs, to 160lbs, which under favorable conditions will be reached in six to eight months, according to breeds and methods of feeding adopted. When, however, we are catering for the English market we shall have to aim at heavier carcasses, in

which, for length, a Tamworth cross will always prove useful. On this market carcasses of 160lbs, to 200lbs, are preferred; the bacon is said to be better flavored and primer than that from more immature animals. These weights can be reached under 12 months without difficulty.

Pigs will consume almost any type of food, and as such are supplied with all sorts of offal and rubbish. Dairy feeding and grain, particularly wheat and barley, supply the best type of flesh. Maize, peas, and beans are used, but give soft dark-colored fat, which is objectionable. On our grain farms we could not do better than clean our grain more efficiently than it is our custom to do, place on the market a sample that is a credit to us, and feed pigs on the offal grain.

AGRICULTURAL EXPERIMENTS.—REPORT FOR YEAR 1915-16.

EXPERIMENTS WITH THE MANURING OF WHEAT, CONDUCTED BY Mr. F. COLEMAN, SADDLEWORTH.

(By W. J. Sparford, Superintendent of Experimental Work.)

For the last 11 years Mr. Coleman has very carefully conducted experiments testing the effects of various manures applied to wheat crops grown on bare fallow. For this purpose Mr. Coleman has set aside a field, one half of which is bare fallowed every year, the other half carying the wheat crops. Each half is permanently pegged into plots, ensuring that each time the plots are cropped they occupy exactly the same space. Each plot receives exactly the same manuring every time that it is in crop, so that the longer these experiments are continued the greater will be their value.

The results from these plots have been published every year, together with some remarks by Mr. Coleman. For 1915 Mr. Coleman says:—"These plots were very unsatisfactory this year, excessive wet soon after seeding very seriously affecting them. No. 5 appeared likely to become an absolute failure, and No. 7 was little better. Later, wild oats and weeds, especially milk thistles, took possession of the plots to such an extent that they became worse than any of the surrounding paddocks. From seeding No 7 came away slowly, and at no time, nor. I think, in any part, was it as good as No. 6 or No. 8. Plot No. 5 would have been a greater failure but for the outside edges, which were the only parts carrying grain worth mentioning."

Table 1.—Showing Yields for 11 Years of Manurial Plots at Saddleworth.

Each Plot Half-Acre in Area.

assume to 17 minutes of the transition of the contract of the	Pro	т 1.	P1,0	т 2.	Pro	т 3,	Pro	т 4.	PLO	т 5.	Pao	т 6.	PLO	т 7.	PLO	т 8.
	lcwt, Mineral Super.	per Acre.	lewt. Mineral Super	5cwts. Lime per Acre.	lewt. Mineral Super., sewt, Sulph. of Potash,	fewt. Nitrate of Soda per Acre.	lewt, 3one Super.	per Acre.	N N	No Manure.	lowt, Mineral Super.	gewt, Sulph, of Fotash per Acre.	gewt, Sulph. of Potash and gewt. Nitrate of Soda	2cwt. Mineral Super. for last 4 Years	lowt. Mineral Super.,	fewt. Nitrate of Soda per Acre,
	Bush	.lbs.	Bush	ı.lbs.	Bush	. lbs.	Bush	, lbs.	Bush	.lbs.	Bush	.lbs.	Bush	.lbs.	Bush	. lbs.
1905	31	0	29	22	33	48	34	36	29	50	35	6	30	38	33	10
1906	32	20	34	10	32	22	33	56	23	40	33	34	24	42	36	8
1907	35	42	38	2	39	8	36	22	24	52	35	32	25	16	35	50
1908	17	38	19	28	20	52	17	34	7	36	19	36	8	50	18	52
1909	31	42	32	54	35	6	30	40	24	32	29	34	23	18	33	34
1910	21	4	22	26	25	20	26	24	15	12	28	34	15	28	29	38
1911	21	54	24	0	24	40	24	44	15	30	24	6	15	34	20	40
1912 ,,	23	34	27	22	27	50	28	56	12	58	26	14	29	36	23	58
1913	26	22	26	3 .	25	14	24	36	4	56	22	44	21	10	20	34
1914	7	34	11	54	10	46	12	0	5	56	10	56	12	34	11	44
1915	22	46	18	48	25	26	19	34	1	36	20	54	13	38	21	46
Mean for 11 years	24	41	25	55	27	19	26	18	15	9	26	5	19 *4 y	14 ears.	25	59

^{*}Plot 7, which from 1905 to 1911 inclusive, received ½cwt. sulphate of potash and ½cwt. nitrate of soda per acre.

Table 2.—Showing Increased Yield of Manured Plots over Unmanured Plot in 1915.

Plot 1	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.	Plot 8.
Bus. lbs. 21 10	Bus. lbs. 17 12	Bus. lbs. 23 50	Bus. lbs. 17 58	manure	Bus. lbs. 19 18	Bus. lbs. 12 2	Bus. lbs. 20 10

Table 3.—Showing Value of Increased Yield of Manured Plots over Unmanured Plot in 1915.

	P	lot	1.	P	lot	2.	P	lot	3	P	lot	4	PI	ot	(.	P	ot	7.	P	lot	8.
Value of increase at				1						1		1	£			1					
3s. 5d. per bushel. Cost of Manure	3 0	12 4	4 0	0	18 9	9 10	0	1 18	5 0	3	5	5 6	3	5 11	11	0	1 8	0	3	8 11	11
Net value of incrse.	£3	8	4	£2	8	11	£3	3	5	£2	15	11	£2	1.4	11	£1	13	1	£2	17	11

Value of various manures taken as:—Mineral superphosphate, £4 a ton; bone superphosphate, £5 10s. a ton; sulphate of potash, £14 a ton; nitrate of soda, £14 a ton. These manure-values are obviously incorrect for 1915—in fact, sulphate of potash cost £30 a ton; but this price is due to the war, and as such is fictitious. Should the price of these fertilisers keep high, it will be necessary in the near future to alter the values so that they approach the average.

Table 4.—Showing Increased Yield of Manured Plots over Unmanured Plot for the period 1905 to 1915 (11 Years); together with Net Value of Increase and Average Annual Increase.

design to the contract of the		Comment of the contract of				the art of the contract of	PARTITION AND THE PARTY
	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 6.	Plot 7, 4 years.	Plot 8.
Increased yield for	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.	Bus. lbs.
11 years	104 58	118 24	133 54 1	122 45	120 12	51 32	119 16
Value at 3s. 5d. per bushel	1	,	£ s. d.	1			
Net value of increase	15 14 8	14 16 4	12 19 6	17 18 11	14 9 8	7 4 1	14 6 6
Average annual value of increase	1 8 7	1 6 11	1 3 7	1 12 8	1 6 4	1 16 0	1 6 1

THE AGRICULTURAL OUTLOOK.

REPORTS FOR MONTH OF JANUARY.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective Managers:—

Booborowic.—The weather has been dry; a very hot spell has been followed by a change of cool, cloudy days, with dewy nights. The majority of the wheat is carted out of the fields, and wheat carting to the railway is being pushed on with. The shortage of stock will allow some of the native grasses to seed and recover where they were thinned out during the drought. A few cases of trouble through horses eating wheat have occurred. Bores are being put down and good water obtained on many of the neighboring farms.

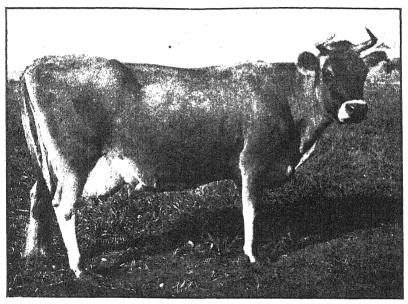
Eyre's Peninsula.—The weather has been warm and dry, and very suitable for burning operations. Only 4 points of rain were registered for the month, which is slightly below the fall registered for February, 1915. One very severe heat wave extended from the 11th to the 17th instant, otherwise the temperatures have not been unpleasant. Several heavy winds occurred, which materially assisted the bush fires. These did no damage in the immediate neighborhood, but the hundreds to the south suffered badly. There is still plenty of dry feed—much more than sufficient for the small number of stock in the district. There is a good supply of water in this hundred, but supplies are short in the more thickly settled areas along the railway line. Evaporation has greatly lessened supplies, even the covered tanks losing considerably through the effects of the weather.

Kybybolite.—The weather has been generally fine, mild, and pleasant, except for a heat wave which lasted for three or four days; this was followed by a pleasant cool change; total rainfall, 28 points. Harvesting operations are completed, and returns are very satisfactory in most cases. Summer crops improved after the last showers. Dry feed is more abundant than usual at this time of the year. Stock are in good condition and healthy. The Rutherglen fly has disappeared since the rain.

Turretfield.—During the first three weeks hot to very hot weather was experienced, with one or two thunderstorms, but very little rain. Winds were moderate to strong, with some duststorms. The latter part of the month was cool. Harvesting operations are completed, and returns all round appear to have been very satisfactory. Lucerne, dependent on river water for irrigation, did not make heavy growths, though yielding fair cuts. The water has not been fresh enough to permit of good floodings. As a result of the experience gained during the drought, farmers are going in extensively for fodder conservation. Cocky chaff is being stored and protected, and hay and straw stacks have been built in abundance to provide against contingencies. Feed is still plentiful. Stock throughout the district are in first-class condition. Owing to the continued dry weather the South Para River has been reduced in volume to a mere trickle, and irrigation with the river water has not been possible during the whole of the summer months.

Veitch.—The temperature for February taken right through has been mild, although a hot week was experienced during the middle of the month; 3 points of rain fell during the month. There is good rough feed in the shape of dry spear grass and stubble feed. Stock are all in healthy condition. The greater part of the wheat in the district has now been carted into the Veitch Siding, and preparations are now being made for the coming seeding.

A PROFITABLE COW.



Stud Jersey Cow, "Jess" (now under official test), the property of Mr. E. C. Deland, of Blyth.

Born August 15th, 1907. Sire "Optician" (imp.), who was purchased from Lord Rothschild (England); dam "Fidgett," bred by the Hon. J. McCulloch (Victoria), by "Katie's Lad" from "Sunflower" (imp.).

This cow has proved a most profitable milk and butter maker. During the past year she was kept in milk right up to the morning of calving (a great mistake), the total period of lactation being 11 months, the owner experiencing difficulty in drying her off. The owner states that she gave an average of 33lbs, of milk daily covering the first five months of her milking period. For the next four months the average per day was 26lbs, and the final two months (of the 11 months in milk) she averaged 18½lbs, per day.

In all the tests, which were made weekly, the fat content averaged 4.8 per cent., the highest reading being 5.2 per cent. and the lowest 4.2 per cent. The total milk yield by "Jess" was 1,021½galls, for the eleven months, of an average test of 4.8 per cent., which, if reduced to commercial butter—that is, butter in which salt and 15 per cent. of water, etc., are incorporated—equals 540lbs., which, at 1s. per lb., would realise the creditable gross return of £27.

FOOD SUPPLY.

The food supply was not anything special, and included no green foods, such as lucerne, maize, etc. Dry food, wheaten chaff, bran, cocky chaff, and molasses constituted the ration, with green pasture for four months of spring. Good water was always available, feeding and milking was regular. The comforts of shelter during summer and winter and kindly treatment went far to insure such a good return. The live weight of this cow is 750lbs; her total weight of milk for 11 months was 10,215lbs., which is equal to a dozen times her own weight.

Assuming that the cost of keeping the average cow is £6 10s. per annum under normal conditions, which allows for food, labor, and interest on capital value, and the average cow yields 300galls, during her period of lactation or for the year, then reduced to pounds, shillings, and pence at 54d. per gallon, the returns of the average cow compared with "Jess" are as follows:—"Jess" 1,021galls, milk at 54d. per gallon, £22 7s. 1d.; average cow, 300galls, milk at 54d. per gallon, £6 11s. 3d. Deducting the cost of keeping from each cow, viz., £6 10s., shows a profit of 15d. on the average cow, and £15 17s. 1d. for "Jess," showing this Jersey cow to return a net profit over 250 times greater than the average cow.

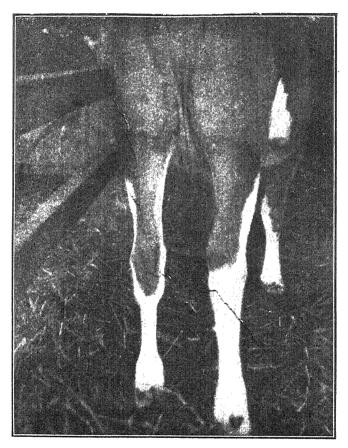
There exists to-day a very wide gulf between not only the profitable and unprofitable, but also between the just profitable and profitable cow. This can be most quickly bridged over by the dairyman adopting better practice in the direction of combining breeding from pure sires coming from proved milk and butter ancestry, and the feeding of such progeny with suitable food rations.

It will be noted that Mr. Deland's Jersey cow was kept at work making milk profitably for 11 months, proving her to be a consistent milk and butter maker. Persistency is offtimes overlooked by dairymen when gauging the value of a cow. Often we find certain cows of a herd yielding liberally for three or four months and then suddenly cutting out, quickly decreasing the amount of milk, becoming but strippers at five months from calving. Such cows fall far short in profit making.

Persistent powers of milk making and merit to make for heavy yields of milk is largely transmitted from the ancestry, and offspring so bred can readily be made less valuable as dairy cows by improper treatment, such as, (1) insufficient suitable nutritious food during that period from birth till they themselves come to work at the bails,

sufficient nutrition being necessary for the development of both dairy form and secreting organs; (2) allowing calves to run with their dams, and giving them too much fattening food, thus cultivating the habit of making beef.

After parturition, or calving, the heifer on her first calf should have special attention, receiving at all times a sufficiency of suitable milk-making food over and above that required for development of frame. Heifers on their first calf should be kept in milk for eight to nine



Judiciously fed Heifer, showing good Dairy Development.

months, even though they give small yields during the second four months; such treatment encourages a prolonged period of lactation after future freshening or calving. Dairy cattle are creatures of habit, and should heifers be milked only for three or four months and then dried off, they will, after future calving, look to dry off at a similar period.

Possibilities of the Present Herds.

Statistics of the Commonwealth indicate that the average production of dairy cows in Australia is 280galls. This appears to be low, but it must be remembered that it is so principally because recognition is not given to the fact that in many cases cows are only milked during the flush of the natural pasture, which is short, and little provision is made for augmenting that supply by providing suitable Consequently, many thousands of dairy cows are dried off after a period of six months' milking. There are many herds in South Australia which average over 350galls,, but I feel sure that under proper conditions of feeding and management, these could be made to yield an average of up to 515galls. I take it that the average herd of, say, 10 dairy cows in this State could be made to yield as follows:—1 cow 650galls, for lactation period, 2 cows 600galls., 3 cows 500galls., 4 cows 450galls., the average for the 10 thus being 515galls.

Under a system of testing, weighing, and keeping records, many farmers would find that they were harboring too great a number of cows not showing any profit, and many cows yielding far short of others in fat and milk. If, out of the herd of 10 cows under notice, the four worst were discarded the average yield would be 558galls. for the remaining six cows; if the seven worst were discarded the average yield would be 616galls. for the remaining three.

It has already been shown that after allowing for the selling of the milk (300galls, from average cow) at 5¼d, per gallon, and deducting the cost of keep, etc., a profit of 1s. 3d, per cow is left under the present average conditions; whilst under judicious treatment we get an average of 515galls, at 5¼d, giving a net profit of £4 15s. 4d. From this it will be seen that 10 cows properly kept show a net profit of £47 13s. 4d., as against 12s. 6d. from 10 average cows kept under the average conditions obtaining—a difference of £47 0s. 10d.

If, of the well-fed herd of 10, the seven worst are rejected, the dairyman would have three instead of 10 cows to milk and keep, and instead of only getting 12s. 6d. profit over all costs from 10 he would be milking three and have a profit of £20 18s. 6d. In other words, he would require to milk well over 100 cows of the 15d. profit class to make as much profit from milk selling as one well-fed cow.

Much, if not all, of the so-called slavery so often associated with dairying is caused by owners neglecting to properly feed, test, and cull; greater efforts in this direction would remove for all time any existing disadvantages, bringing about greater contentment and prosperity.

THE FORCE OF HEREDITY.

[An address delivered to the Conference of Mid-Northern Branches of the Agricultural Bureau, at Gladstone, by Fras. Evelyn Place, B.V.Sc., M.R.C.V.S., &c., Government Veterinary Lecturer.]

It savors of presumption in one like myself, busied with the traffic of everyday life, to attempt to speak on such a subject, for, as Professor Bateson says, "When we contemplate the problem of evolution at large, the hope, at the present time, of constructing even a mental picture of that process grows weak, even almost to the point of vanishing. We are left wondering that so lately men in general, whether scientific or lay, were so easily satisfied. Our satisfaction, as we now see, was chiefly founded on ignorance."

What horsebreeder in this district cannot assent to this? What sheepbreeder but who will agree? And yet a Royal Commission lays down a list of hereditary diseases that disqualify a horse, or a line of sheep springs into popularity by the persistence of some desired quality, practical facts that we know of in the show ring or the paddock, insistently brought to our notice by men who never opened the "Problems of Genetics," or to whom the name of Mendel is unknown, men who have watched the force of heredity and turned some of the stream into their own leats; men who speak with authority on a point, and whose yea is yea on that point only, though sometimes they are inclined to extend their authority to generalities on the strength of it—a weakness common to the priests of mystery throughout the ages, and, alas, a commercial necessity; and we who are outside the veil have to admit to ourselves that all the various theories with regard to the working of organic evolution cannot all be correct in all their details; but it may be that each contains its own elements of truth, and that, if these elements can but be recognised and sorted out, they may give us safe ground to work on. But in such a complex problem many factors have to be taken into account, and that widely different views may be merely one-sided, and not necessarily mutually exclusive, and there seem to be three Whys requiring an answer.

1. Why, on the whole, evolution has taken place in a progressive manner along definite and divergent lines. Why the Jersey of to-day is more profitable than the Alderney of yesterday?

- 2. Why individual animals become adapted in body and behaviour to the conditions under which they have to live? Why the Flemish horse "ayont the Tweed" becomes a Clydesdale, while on the Lincoln wolds he appears a Shire?
- 3. Why evolution has resulted in the existence on the earth to-day of a vast number of well-defined groups of animals? Why a sheep on the Dorset coast has a pink nose and horns, while another in Shropshire has a black face and short wool, while around Gladstone another specialises in a dense lustrous Merino fleece that fetches anything up to $27\frac{2}{4}$ d. a lb.

THE PROGRESS OF ANIMALS.

The practical point is, why do animals progress at all instead of remaining stationary? Because they accumulate capital, they save potential energy, and each succeeding generation gets a better start in life and is able to rise a little higher. Improvement is bound to follow this accumulation of surplus energy, and when there is nothing to counteract it, no drought, no neglect, each generation gets a better start than its predecessor, and is able to carry on a little further its struggle for existence with its surroundings. And this saving commences in the egg cell, is carried on in the supply of nutriment to the newly born; and the breeder has to see to it as the young grows up. So that an animal really inherits from its parents two things, (1) a certain amount of living tissue, protoplasm, loaded with potential energy with which to start in life, and (2) appropriate surroundings.

Clearly the one is useless without the other; an egg cannot develop unless it is provided with proper environment at every stage. Therefore, when we say that an animal inherits a particular character from its parents, we mean that it inherits the power to produce that character under the influence of surroundings that favor such. The inheritance of environment is of at least as much importance as the inheritance of the material of which the body is composed, which latter is a very small amount indeed. The amount of material in an egg cell is almost infinitesimal compared to the bulk of the adult, nearly all of which is obtained from surroundings.

This response to surroundings is not merely mechanical, but there is purpose in it, which results in modification of build; hence the evolution of body form will be adaptive and follow definite lines, else we should have no Canowie or Bungaree lines; but many minor modifications arise and persist, so that in one flock every ram is not a champion—they are incidents, and have little bearing on the build of the line.

As unborn babes we still have gill slits such as had the dragons of our fairy tales; they had a use for them, so we have them; but as life progresses that use falls out of fitness with our surroundings, and the condition of an animal's life at any given stage depends on the fitting in of the last development of a chain of changes of a tissue or organ with the last development of a chain of changes in its surroundings; agreement means improvement, disagreement the reverse. Change of surroundings must obviously be slow, and change of habit must react and bring about a corresponding change in the surroundings in which the young develop.

The character of each stage in life being must depend on (1) the shape and working in the preceding stage, and (2) the nature of surroundings in which development is taking place; but these two sets of factors cannot be sharply distinguished, for in a certain sense the surroundings gradually become part of the body itself as development proceeds, as when the calf becomes a grass-eater and his paunch develops accordingly and the influence of this internal surrounding becomes more and more important.

The whole process of evolution depends upon changes of surrounding taking place so gradually that the necessary self-adjustment of the body at every stage can be carried out. Each step in development is built upon its predecessor, and the whole process takes place by slow and imperceptible degrees.

We therefore arrive at this result, that all the characters of the adult animal are the result of the reaction of its make-up to surrounding forces both outside and inside itself. All that the body actually inherits is a certain amount of protoplasm, endowed with a certain amount of energy; and a certain amount of surrounding conditions. In so far as these are identical in any two successive generations, the result must be identical too—the offspring must resemble the parent; in so far as they are different the offspring will differ from the parent, but differences in surroundings must not be very great, or development will cease altogether.

But in endeavoring to make the matter simple one falls into error, for it would seem that all eggs developing under the same conditions from start to finish should give rise to the same adult form, and we know that this is not the case—"kultur" has not produced battalions of supermen.

We know from observation and experiment that the egg is by no means a simple thing, but a very complex one, and that different parts of the egg are directly concerned with certain parts of the adult body, and at certain periods in the egg's existence there are

perfectly well-defined bodies called chromosomes, which are definitely related to special parts of the adult body; so that we must try and account for the great complexity of structure which egg cells have acquired and watch the effect of this complication on the development of the individual and the race. We must look on the egg as containing cell substance and a more active or nuclear part, for they allow us to deal with two sets of factors.

GROWTH OF THE EGG CELL.

During the formation of the egg the egg cell grows by absorbing nutriment from the body in which it is enclosed, and this nutriment is used to build up the yolk food. It is reasonable to suppose that this nutriment will vary with the changing character of the body that supplies it, and doubtless the change is of a chemical character, fairly easy to determine, as the chemical differences of male and female blood may be. Experiments have shown that substances taken in with the food may bring about marked modifications of body structure and may be absorbed and stored in the egg cells so as to bring about corresponding changes in the adults into which the eggs develop; so one sees that the egg may become the repository of definite chemical substances, organ forming substances, which will influence the development in a particular manner as soon as the appropriate conditions arise.

This is one of the reasons why the egg cells of different animals vary in regard to their potentialities for development. Now for a moment we must inquire how the nucleus of the egg cell, or to slightly alter the term, the germ cell, acquired its great complexity of structure. We have changed the egg cell to germ cell because a new complexity has been introduced, namely the sexual process, the recurring union of germ cells in pairs, a process essentially the same in the higher plants, animals, and one-celled organisms—a process simple in the extreme in its conception, but one that gives rise to endless permutations and combinations as it is repeated generation after generation. For we find in the body cells double sets of chromosomes, one derived from the male and one from the female parent, and by experiment we obtain strong evidence of the existence in the germ plasm of definite material substances associated with the inheritance of special characters. These are called factors by the followers of Mendel, who at the moment is the fashionable authority to quote, and we may adopt the name without subscribing to the theory; and those of us who have not forgotten the algebra of our school days will see what an interesting thing is the possibility that arises through the sexual process of the permutation and combination of different factors derived from different lines of descent. It has often been a matter of wonder and admiration to me to note how the expert bridge player memorises those of the pips on the cards, or the way in which the racing man can memorise those of the male and female forbears of a cup favorite; the same ingenuity and application brought to bear on the pedigree of a ram should bring in a fortune.

INHERITANCE OF CHARACTERS.

There is no doubt that a vast number of characters are inherited in what is called the Mendelian manner, and as they are capable of being separately inherited and interchanged by crossing we are justified in believing that they are separately represented in the germ cells by special factors; but, as Professor Dendy puts it, "Important as this result is, I believe at the present time there exists a distinct danger of exaggerating its significance. many new and apparently permanent combinations of characters may arise through hybridisation, and that the organisms thus produced have all the attributes of what we call distinct species, does not justify us in accepting the grotesque view-as it appears to methat all species have arisen by crossing, or even the view that the organism is entirely built up of separately transmissible 'unit characters.' ' It appears to be a substitution of the orderly ugliness of a card index file for the facile grace of a Rheims cathedral, an attempt to fix a unit book case in a Gothic niche. And it is a significant fact that the only characters that appear to be transmitted, according to Mendel's theory, are comparatively trivial features of the organism. It must be so, for any two animals sufficiently nearly related to be capable of crossing are identical as regards the vast majority of their characters. It is only those few points in which they differ that remain to be experimented on.

Certainly the attempt to breed a Derby winner on Mendel's lines would result in failure, and the whole history of stockbreeding throughout the world demonstrates that the theory is not an easy road to perennial success. The animal into which the union of the male and female cells develops must be a composite body, deriving its building material in the womb from different sources; but this cannot affect its structure as a horse or a sheep, for the two parents must have been alike in all essential respects or they could not have interbred, and any important differences in the germ plasm must be confined to the factors for the differentiating characters.

The race structure still develops on the basis of a similar germ plasm and under essentially similar conditions as in the case of the two parents, and there is no reason to suppose that special factors have anything to do with it. Thus we see how new unit characters may be added by mutation and interchanged by crossing, while the race constitution of the animal remains the same. All such characters are chance modifications of the germ plasm, and they appear to have comparatively little influence on the course of evolution. The fox terrier bitch lined by a spaniel will at the next litter throw winning terriers.

ADAPTATION TO SURROUNDINGS.

A remarkable feature in evolution is that the animal adapts itself to its surroundings. It might do the opposite; many do and die out, but when an animal is in tune with its world, can pick out the wireless messages of its environment, each generation gets a better start than its predecessor. Such adaptation or adjustment is essentially intelligent, a reaching out of antennae for communications from beyond, outside Mendelism, outside the dreams of our philosophy. Sometimes we call this adjustment Natural Selection, and very narrow are its limits.

Much of the confusion that has arisen with regard to the inheritance of acquired characters is due to the unjustifiable limitation of the idea of inheritance that is common. The inheritance of environment is just as necessary as the inheritance of the material foundation of the body, and whether or not a newly acquired character will be inherited must depend upon whether or not the conditions under which it arose are inherited. Thus it is quite impossible to apply Mendel's principles to breed out sidebones, for instance. Experience teaches us that we shall not get his three dominant sidebones and one recessive sound in the first cross, nor his dominant sidebone and two either sidebones or not with one sound in the second cross; but experience does teach that soundness, shape, and surroundings will produce the class of stock we require, and wrong as it may seem for a veterinary surgeon to say so, I would put shape before soundness, for the somewhat cryptic reason that I desire to see soundness The majority of undesirable unsoundnesses in horses, of weak points in cattle, sheep, or pigs are the perpetuation of acquired characters that are not essential to the race body and are only perpetuated through carelessness. Take sidebones in the Shire, for instance; in 1884 80 per cent. of exhibits in certain classes at Islington were thrown out for that reason; thirty years later only 2 per cent.; the undesirables had been dropped.

Again, take ringbone, common in the Shire at one time, equally rare in the Clydesdale then, both fundamentally one stock, but one overweighted in front, the other clean shouldered; surroundings had told in each case. Our Merino in germ plasm is essentially the

Merino of Saxony or Rambouillet, but in fleece is the Merino of the South Australian breeders' brains, the result of noting when the sheep is in tune with its surroundings and rigorously excluding surroundings unsuitable.

The responsibility is lightly thrown on Providence when we get hereditary misfits, whereas the truth of the matter is that animals get a fair start and man intervenes and makes mistakes; when he realises them he becomes a successful breeder, and when he fails he is generally too unjust to put the blame on his own shoulders.

The breeder in a small way is the guiding deity of his stud, and his mistakes will appear a thousandfold if he persists in them, while Nature's will tend to disappear, in both cases because of the force of heredity.

SEASON AND COAT.

An ungroomed draught horse will clip 7lbs, to 8lbs, of hair, while a thoroughbred will yield scarcely 3lb., and in either case there are between 4,000 and 5,000 hairs to the square inch. They contain some of the richest food products of the body, and are changed with the seasons.

Their number, their rate of growth, and their composition are reasons why a horse is often out of sorts when he is changing his coat.

One of the reasons why horses become uneasy at the approach of rain is because the hairs, unlike most substances, lengthen somewhat as the atmosphere becomes moist, and so an inclination to shiver is started.

Animals always exposed to the sun and air become sunburnt; the coat is rusty, and long, dead, staring hairs may be noticed in the coat.

The hairs are shorter, smoother, shinier, and darker in summer than in winter.

Shedding the coat results in lighter hair, because hairs are always lighter at their base than at their point.

A good horse is never a bad color.

When the coat is changing elbow grease is the best application, but there is no need of a currycomb.

Digestion is often upset at the time of casting the coat, and it is a good plan to give a few daily doses of an ounce or so of sulphur when this operation is going on.

A horse grooms himself in the paddock, but needs the brush in the stable.

CHICORY.

In reply to an inquiry, the following particulars were supplied by Mr. Rodney Fowler (Inspector of Orchards in the South-East).

Chicory is grown in the South-East only in the peat lands at Rendelsham. The area planted is limited, and depends upon the orders received from Adelaide merchants; it being the custom to place orders a season ahead.

From what I gathered in conversation with growers when in Rendelsham, the ground to be planted is ploughed about the middle of August to kill the weeds, &c., and the seed is sown early in September, 2½lbs. of seed being used to the acre. It is sown with the ordinary onion drill in drills 7in. apart.

The after cultivation consists only of hand weeding, as it does not do to disturb the peat on account of its liability to drift and blow away. In fact, this is one of the greatest troubles growers have to contend with; one grower informed me that he had sown twice this season, and had not a plant left. It is not spaced or thinned at all. It is generally sown in a direction in which the wind will cause the least injury, the natural lay of the land being taken into consideration.

A strip of rye is generally sown every chain or so to act as a wind-break. Digging commences on the 1st June, three drills being placed in a row; then carted to a trough, where the tops are cut off and the chicory washed with a rough stable broom, and then bagged. The manure used is superphosphate, at the rate of one bag (200lbs.) to the acre.

About 30 acres to 40 acres are grown in Rendelsham every year, and the yield is about eight to 14 tons to the acre; portion is sent to Beachport for kiln drying, and portion is sent direct to Adelaide. The cost of production is about as follows:—Ground rent, £2 an acre; seed, and putting in, 15s. an acre; harvesting, 25s. to 27s. 6d. per ton; market value, £3 7s. 6d. bags found, on trucks Rendelsham.

There are some hundreds of acres in the district that would grow chicory well, but the market is at present limited. I understand a movement is on foot to establish a kiln at Rendelsham with a view of finding outside markets, and encouraging growers to go in more largely for this crop. It can be grown on the same land two or more years in succession, the chief difficulty being the weeds and wind; it improves the land for cereal growing, though rye and barley are the only grain crops that grow well in the peat land.

POULTRY NOTES.

[By D. F. LAURIE, Poultry Expert and Lecturer.]
UNSOUND EGGS.

As a result of the recent heat wave the market reports show a fall in the price of eggs. The fall was stated to be due to the unsatisfactory condition of country eggs arriving in the Adelaide markets. For how long will the producers continue this shameful waste of valuable produce? This fall in price affected all the producers of first-class fresh eggs. The export price makes the local market. The truth is that many people are too lazy, prejudiced, and ignorant to learn how to improve matters.

A LARGE POULTRY PLANT.

Three years ago last November Messrs. Pope Bros., & Co., started their plant at Hectorville. So impressed were they with the importance of guarding against the poultry tick that they asked me to design buildings with angle iron frames, and these were erected. Since the first portion of the plant was put in the business has grown, and there have been constant additions to both stock and plant. On a recent visit I noted about 3,000 head of healthy fowls, the majority of which were White Leghorns. In addition there is a fine stud of first-class Black Orpingtons of fine type and great utility. Rhode Island Reds and Buttercups are also gradually increasing.

A new 140ft, scratching shed was housing 800 pullets, and there are two others each 100ft., of the Parafield standard, with here and there Breeding pens are being erected so as to ina slight modification. crease the accommodation to 450-500 breeding hens. Sixty-six additional single test pens will bring the total to 92. The two 40ft. brooder houses are being connected, and with considerable additions, will make one big house 150ft. long, in 2ft. sections, and heated by a coke-burning heater. This house will accommodate 3,000 chickens. Following the Parafield lead a mammoth incubator of 5,000 cgg capacity is being installed. This will be a double decker, coke heated, but differing in many respects from the Parafield model. When these additions are completed the "Rossmore" Poultry Farm will accommodate 5,000 layers, besides breeding stock, &c. It is very satisfactory to note the progress of such a large establishment. tinuous enlargement speaks volumes for the success of the venture.

MANY SMALL PLANTS.

Nearly every day plans of small to medium-sized poultry plants are forwarded to applicants. There are now in this State hundreds of poultry plants erected to the departmental standard, and in time the number should total thousands. The system has proved admirable

for all conditions. The "fly in the ointment," however is the extreme price of building materials. There is no satisfactory substitute for galvanized iron, which is far away the best roofing material for poultry buildings. All imported material is higher in price owing to the high freights charged. Then again, galvanized iron and wire netting are specially dear, and all iron has advanced, and is likely to be dear for some time. I am often asked for advice on the question whether to build at the present high rates or to wait. I am not a prophet, and cannot say when the materials will return to normal prices. The prices of eggs and poultry are likely to remain at satisfactory rates for some time, at any rate, and although it costs double as much for galvanized iron, I think people are justified in building, at any rate, their minimum requirements.

PRICES NEXT SPRING.

Shipping is scarce, and will continue so. Therefore the immediate prospects of oversea shipments are dim. Some people are afraid that with a big increase in poultry production there may be a slump next spring—a return to the prices of old days. Breeders have the remedy in their own hands. There is no compulsion to sell at such low prices; there is such a thing as combined action. All the machinery necessary to that end is in existence.

EXAMINING SICK FOWLS.

Daily inquiries are made as to cause and cure of ailments among poultry. As a rule, a marvellous lack of observation is noticed. Writers are seldom able to give any information likely to assist diagnosis. Many cannot even describe the actions and condition of the sick birds. At this time of year the two main causes of trouble among poultry are due to parasites. The tick is one parasite (external), and the round worms are the other parasites (internal).

The tick has been dealt with by me on many occasions. When talking to breeders one gets the impression that everyone keeping fowls knows all about tick. Yet the facts show otherwise. Few people trouble to examine the cracks and crevices in the woodwork, and yet there one should look. Only the larval stage is found on the fowl. Quite recently one of the poultry writers, in giving advice, stated that the young tick are found under the skin. This is a mistake, and is misleading, also. Those in doubt are advised to procure a simple lens and examine the matter. They will then find that the larval tick is six-legged and adhering by its mandibles, which are deeply inserted into the tissues of the bird.

. If only a few tick are present they will account for periodical losses. The tick feeds at intervals, not every night. Kerosine is the best and safest to use for destroying tick. People often say they have

"sprayed" the poultry house. Spraying is of little use. You should use an oilean with a long spout, and pour the kerosine tuto all the cracks and crevices, and so destroy the tick. This takes a little more time, but is effective.

WARNING.

Despite the provisions of the Stock Diseases Act the majority of poultry owners neglect obedience to the law. The Act demands that tick-infested premises are to be reported, also that the tick must be eradicated under penalties. A good many people are using the so-called tick-proof perches, and are neglecting to destroy the tick in the houses, fences, &c. Unfortunately some writers have given bad advice to this end. It will be a sad but necessary duty to prosecute some careless persons. Forewarned is forearmed. The sooner some drastic action is taken the better for the poultry industry.

Worms.

Round worms, especially, are very prevalent, and during the summer months cause great mortality. Often, apparently healthy hens, laying and young stock, will sicken and die. All sorts of theories are put forward, and yet even experienced breeders are too foolish to ascertain the cause. All birds which die should be examined. Cut down and remove the entrails. Then slit up the long intestine, and you will soon find the worms. Symptoms of worms are as follows: Food remains in the crop; comb becomes congested and dark; the bird is often thin and flesh dark; there is often great thirst, and the droppings are yellowish and offensive. The course of the disease towards the end, when the foregoing symptoms are noticed, is rapid. Onions and garlie may be fed occasionally, but it must be remembered these fragrant "herbs" will taint the eggs. They will assist Nature to expel the worms. Bicarbonate of soda, which has been recommended by some, has no effect on worms.

The best method to adopt is to recognise as a fact that all fowls are liable to be infested by worms, and that is the case more especially with young stock and pullets just coming into lay. Use worm powders periodically, as an insurance against worms and losses. The cost is not to be compared with the loss of valuable birds. Unfortunately santonine, which in combination with areca nut is the most satisfactory, is selling at prohibitive rates. Bickford's worm paste, which can be ordered through any storekeeper, is an excellent preparation. It should be used as directed, and as routine treatment twice or three times a year. These worms are not due to feeding the poultry on green feed. This idea is quite common, and is a survival of the dark ages.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, February 9th. Mr. F. Coleman occupied the chair, and there were also present Professor Perkins (Director of Agriculture), Messrs. W. J. Colebatch (Principal of Roseworthy College), J Miller, C. J. Tuckwell, T. H. Williams (Chief Inspector of Stock), Laffer, M.P., G. Jeffrey, and the Acting Secretary (Mr. H. J. Finnis).

Noxious Weeds.

In response to a recommendation from the Board respecting the desired improvement of the position in relation to the control of noxious weeds, the Minister of Agriculture (Hon. C. Goode) intimated that the matter would receive consideration in connection with legislation to be introduced during the next session of Parliament.

WHEAT ADVANCES.

Referring to a letter from the Warrow Branch of the Bureau, urging that the amount of the advance to be made to farmers for wheat delivered should be increased, the Secretary to the Minister of Agriculture wrote that the Minister desired him to point out that it was impossible to increase the first payment, but that so soon as the overseas sales justified it, the question of an additional payment on account would be considered.

EXPERIMENTAL FARM ON THE MURRAY.

A report by the Director of Irrigation (Mr. S. McIntosh) respecting a resolution adopted by the conference of the Murray River Branches at Renmark, in November, in support of the establishment of a demonstration farm and improved type orchard somewhere on the river, was read by the Acting Secretary. After the subject had been discussed it was decided, on the motion of Mr. Laffer, seconded by Mr. Jeffrey, to inform the Renmark people that the matter was being considered by the Government, but that owing to the state of the finances, nothing could be done in the directions indicated at present.

BLUESTONE.

Dealing with a recommendation by the Clanfield Branch that bluestone should be sold on analysis, the Chief Inspector of Fertilisers (Mr. G. Quinn) reported:—"A standard for bluestone may be fixed under the provisions made in the Insecticides Act of 1910. I may say the publication of standards for insecticides and fungicides has been delayed in this State, pending joint action by the adjoining States; but it is questionable whether such a reason should delay our action any longer." In the discussion which ensued it was generally agreed that the quality of the bluestone marketed in South Australia was very satisfactory, and afforded no room for complaint. Ultimately the Board resolved, at the instance of Mr. Tuckwell, seconded by Mr. Miller, to refer the original communication back to the Branch, requesting that it should furnish evidence—if any were available—of impure bluestone having been sold, and pointing out that in cases where impurities were suspected, the Department would be glad to have analyses made, with a view to determining the precise quality. Professor Perkins suggested that probably when the fungicide failed to prove effective, the trouble often was that the material had not been handled properly. He had always found the bluestone sold in South Australia to be very good; at the same time it certainly was one of those things for which a standard could be fixed.

EXPERIMENTAL FARM AT YEELANNA.

The following resolution was received from the Yeelanna Branch—"That this Branch desires the Board to take steps to secure the establishment of a seed wheat depot of an experimental farm at Yeelanna." Professor Perkins said in view of the fact that already its hands were full, he did not see how the Wheat Harvest Board could do anything in connection with the handling of seed wheat. There was nothing, however, to prevent the farmers from selling such grain one to another. The financial stringency precluded any thought of establishing another experimental farm. It was resolved, on the motion of Mr. Miller, seconded by Mr. Colebatch, to write to the Branch in these terms.

THEE MEMBERS.

The names of Messrs J. K. Deer (who had been a member of the Port Germein Branch since 1895) and Mr. H. F. L. Holzgrefe (a member of the Millicent Branch for 26 years) were added to the list of life members.

NEW MEMBERS.

The following names were added to the membership of existing Branches:—Naracoorte—J. P. Spence, C. J. Jenner; Meadows—H. Warland; Geranium—H. Rowley, P. Rowley; Meningie—A. Ayers, J. Kain; Mount Remarkable—F. H. Foot, R. Davis, W. F. Ey; Mount Gambier—W. Aslin; Cygnet River—A. C. Osterstock; Sherlock—G. T. Tiller, S. G. Tiller, D. Nock; Berri—E. Harris, G. R. Fernie, R. J. Jaenish, H. H. Gray; Lyndoch—G. Lawes; Clarendon—J. H. Dingle, V. J. Spencer; Milang—S. H. Crittendon; Murray Bridge—C. H. Schurmann, W. A. Piper, A. Modwell, F. H. Provis, J. Homburg, R. Caine, A. V. Pugh, A. Sladden.

THE WHEAT MARKET.

The f.o.b. price quoted on February 29th remained the same as that for January 31st, viz., 5s. 3½d.

STOCKS.

Stocks held by shipping agents on February 29th amounted to 532,282 tons, the quantity of grain shipped to that date being 44,330 tons, in addition to which 2,750 tons of flour have been shipped.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on March 1st:-

BUTTER.—Production in this State continues to decrease, as is only seasonable, and in consequence the proportion of dairy produce coming into this market from the eastern States is on the increase. The depletion of the dairy herds during the last season or two has given dairying a considerable setback, the effects of which show more at this time of the year than in the spring. In sympathy with firmer market ruling in the eastern States, prices advanced somewhat, but values there having now fallen, quotations here represent a substantial easing on values ruling a month ago, "Alfa" now being 1s. 5½d. per lb.; "Primus," 1s. 4½d. per lb.; choice separators and dairies, 1s. 3½d. to 1s. 5d. per lb.; store and collectors, 10½d. to 1s. 1d. per lb.

EGGS.—Market moved erratically, rates going as high as 1s. 3½d. per dozen, when, under the influence of supplies well maintaining and absence of interstate orders to any considerable extent, values eased, the quotations at present being 1s. 2d. per dozen for hen, duck 1s. 3d.

CHEESE continues to find ready sale, both for local and export, prices well maintaining, so that at close of the mouth values were from 10d. to 11d. per lb. for large to loaf.

Bacon.—The high prices ruling for the live animal had the effect of attracting larger quantities to the market, so that the difficulty of curers in obtaining supplies was for the time being overcome. In consequence of this there are better quantities of bacon offering, values being easier, best factory-cured sides selling at 1s. 2d. to 1s. 2d. per lb.; hams, 1s. 5d. to 1s. 6d.

HONEY continues to be extremely scarce, and this also is apparently the condition in other States as well, for interstate inquiries continue to come over here. Prime clear extracted is worth 5½d, per lb.; beeswax, 1s. 4d. to 1s. 5d. per lb.

ALMONDS.—The new season's crop is coming in more freely, but all consignments are readily disposed of on arrival. Brandis, 8d. to 8½d.; mixed softshells, 7d. to 7½d.; hardshells, 3½d.; kernels, 1s. 4d. to 1s. 4½d. per lb.

LIVE POULTRY.—Heavier supplies are coming forward than for some weeks past, and good prices continue to rule, especially for well-conditioned sorts. All coops submitted meet with ready sale. The values at end of month were:—Good roosters, 4s. 3d. to 5s. each; nice condition cockerels, 3s. to 4s. each; plump hens, 2s. 9d. to 3s. 6d. each; small and light hens, 2s. to 2s. 6d. each; light cockerels, 1s. 6d. to 2s. 3d. each; ducks, 2s. 3d. to 3s. 6d. each; geese, 3s. 9d. to 4s. 6d. each; turkeys, 1s. to 1s. 6d. per lb. live weight for fair to prime table birds; pigeons, 7½d. each.

POTATOES AND ONIONS.—The bulk of our potato requirements continue to be drawn from Victoria, and owing to prices being at such a high level, buyers have operated only very sparingly. Moderate supplies are now expected from the Millicent district, and with quotations in the eastern States showing a tendency to ease back, more reasonable prices may be expected in future. Onions.—Local supplies have eased off somewhat, and prices have correspondingly improved. Quotations:—Potatoes, £13 13s. per ton on trucks Mile End or Port Adelaide; and onions, £3 10s. to £4 per ton on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of February, 1916, also the average precipitation to the end of February, and the average annual rainfall.

processing the property of the party of the								-	
Station.	For Feb., 1916.	To end Feb., 1916,	Av'ge, to end Feb.	Av'ge. Annual Rainfall	Station.	For Feb., 1916.	To end Feb., 1916.	Av'ge. to end Feb.	Av'ge. Annual Rainfall
FAR NORTH	and U	PPER N	orth.		Lower	North-	-conii n	ued.	
Oodnadatta	0.22	0.80	0.79	4.76	Spalding	0.02	0.82	0.73	20.25
Tarcoola			0.55	7.58	Gulnare	0.07	0.91	0.60	19.74
Hergott	0-03	0.05	0.48	6.04	BundaleerW.Wks.	0.10	1.26	0.58	17.29
Farina		0.20	0.56	6.70	Yacka	0.09	0.59	0.55	15.27
Leigh's Creek			0.50	8.66	Koolunga	0.22	1.30	0.65	15.94
Beltana	****	0.40	0.71	9.22	Snowtown	0.18	0.41	0.43	15.70
Blinman		0.16	0.78	12.83	Brinkworth	0.09	0.78	0.60	15.48
Hookina	******	0.42	0.0	12 00	Dimkworm	0.22	1.49	0.55	16.34
		0.14	0.48	12.22	Blyth	0.14	1.49	0.78	
Hawker	-	0.14	0.61	11.78	Clare			1	24.30
Wilson		0.18	0.47	10.26	Mintaro Central .	0.18	0.89	0.68	21.99
Gordon		0.02	0.47	13.78	Watervale	0.35	0.74	0.71	27.17
Quorn	0.02	0.70	0.46	9.46	Auburn	0.18	0.91	0.79	
Port Augusta	***************************************			1	Hoyleton	0.21	0.93	0.48	17.96
Port Augusta W.	automité	0.65	0.38	9.36	Balaklava	0.21	0.74	0.47	16.03
Bruce		0.08	0.52	10.01	Port Wakefield	0.09	0.33	0.57	13.13
Hammond		0.15	0.49	11.46	Terowie	0.04	0.68	0.75	13.71
Wilmington	-	0.41	0.52	18.26	Yarcowie	0.01	1.55	0.56	13.91
Willowie		0.11	0.54	11.90	Hallett		0.60	0.55	16.40
Melrose		0.31	0.82	23.04	Mount Bryan	0.11	0.98	0.72	15.73
Booleroo Centre		0.10	0.53	15.83	Burra	0.07	0.87	0.64	
Port Germein	0.03	0.19	0.41	12.84	Farrell's Flat	0.07	0.61	0.60	18.87
Wirrabara	0.01	0.45	0.60	18.91		•	•		•
Appila		0.11	0.64	[15.08]	West of	or Mur	RAY RA	ANGE.	
Cradock			0.63	10.86	Manoora	0.13	0.73	1 0.52	118.09
Carrieton	0.02	0.33	0.44	12.22	Saddleworth	0.12	0.66	0.67	19.69
Johnburg		0.39	0.42	10.21	Marrabel	0.09	0.88	0.50	18.94
Eurelia		0.68	0.48	13.24	Riverton	0.28	2.61	0.60	20.48
Orroroo		1.19	0.56	13.42	Tarlee	0.48	1.19	0.55	
Black Rock		1.01	0.53	12.25	Stockport	0.52	1.99	0.45	
Petersburg		0.82	0.51	13.07	Linnley Bridge	0.31	1.42	0.52	1
Yongala	0.02	0.32	0.58	13.94	Hamley Bridge	0.45	1.39	0.65	1
			1	•	Kapunda	0.43	1.33	0.57	17.85
N	окти-К	Cast.			Freeling	1	1.84	0.64	
Ucolta		0.69			Greenock	0.55		0.62	
Nackara	******	0.63			Truro	0.23	0.80		
Yunta		0.11	0.45	8.22	Stockwell	0.31	1.14	0.62	
Waukaringa	****	0.06	0.40	7-1)4	Nuriootpa	0.44	1.29	0.61	21.25
Mannahill	****	0.31	0.52	8-46	Angaston	0.47	1.32	0.64	
Cockburn		0.04	0.54	7.97	Tanunda	0.35	1.77	0.64	
Broken Hill, NSW			0.82	9.63	Lyndoch	0.13	1.09	0.64	23.01
DIVISOR ETTAL, 21077	1	ţ	0 0	1 000					
Lo	wer N	ORTH.			ADE		PLAINS		
Port Pirie	0.02	0.15	0.42	13.21	Mallala	0.14	0.64		
Port Broughton .	0.05	0.39	0.46	14.33	Roseworthy	0.11	0.60	0.50	
Bute	0.12	0.25	0.39	15.42	Gawler	0.23	1.58	0.65	
Laura	0.06	0.27	0.61	18.22	Two Wells	0.34	1.21	0.45	
Caltowie	0.01	0.70	0.63	17-27	Virginia	0.27	0.78	0.49	
Jamestown	0.02	0.40	0.60	17.46	Smithfield	0.20	0.61	0.62	
Gladstone	0.03	0.18	0.54	16 00	Salisbury	0.27	0.98	0.58	18.57
Crystal Brook	0.03	1.09	0.55	15.62	North Adelaide	0.22	0.88	0.54	21.49
Georgetown	0.03	0.60	0.67	18.32	Adelaide	0.29	0.99	0.62	21.04
Narridy	0.15		0.57	16-79	Brighton	0.18			19.93
Redhill	0.13		0.59	16.79	Glenelg	0.08	1		
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RAINFALL-constanted.

				IN L WIN	a-constitued.				
Station.	For Feb., 1916.	To end Feb., 1916	Av'ge, to end Feb.	Av'ge. Annual Raintall	Station.	For Feb., 1916.	To end Feb , 1916.		Av'ge. Annual Rainfall
ADELAIDE	Draw	a conti	marad		Windan on Consu		٦		
					West of Spen	CER 9 (JULFC	ontinue	a.
Magill	0.20	1.26	0.70	25.69	Streaky Bay		0.27	0.51	15.31
Glen Osmond	0.32	1.49	0.42	25.26	Port Elliston		0.93	0.47	16.49
Mitcham	0.22	0.76	0.54	23.47	Port Lincoln	0.05	0.18	0.50	19.88
Belair	0.12	0.77	0.64	28.64	Tumby	0.02	0.25	0.47	15.00
	_	' '		·	Carrow	0.03	0.13		
Mount	LOFT	RANG	es.		Cowell	0.03	0.11	0.40	11 76
Teatree Gully	0.37	1.38	0.82	28-19	Point Lowly	0.01	0.68		12.21
Stirling West	0.50	1.53	0.99	46.70	·	'		,	1
Uraidla	0.49	1.56	0.94	44.35					
Clarendon	0.25	1.17	0.76	33.67	Yorki	's Pr	NINSULA		
Morphett Vale	0.40	0.88	0.61	23.32					
Noarlunga	0.11	0.55	0.56	20.28	Wallaroo	0.04	0.64	0.39	14.05
Willunga	0.28	0.82	0.71	25.98	Kadina	0.07	0.36	0.37	15.88
Aldinga	0.15	0.62	0.55	20.34	Moonta	0.14	0.25	0.38	15.22
Norman ville	0.18	0.57	0.58	20.65	Green's Plains	0.04	0.24	0.34	15.73
Yankalilla	0.30	0.81	0.63	22.78	Maitland	0.13	0.26	0.46	20.08
Cape Jervis	0.14	0.34	0.47	16.34	Ardrossan	0.15	0.30	0.36	13.89
Mount Pleasant .	0.14			26.87	Port Victoria	0.19	0.28	0.35	15.20
		1.77	0.72	29.38	Curramulka	0.10	0.20	0.36	18.51
Blumberg	0.53	0.92	0.65		Minlaton	0.06	0.26	0.36	17.41
Gumeracha	0.47	1.55	0.74	33.30	Stansbury	0.12	0.33	0.35	17.06
Lobethal	0.42	1.00	0.76	35.38	Warooka	0.05	0.24	0.43	17.71
Woodside	0.52	1.17	0.82	31.87	Yorketown	0.02	0.12	0.36	17.47
Hahndorf	0.36	1.23	0.76	35.45	Edithburgh	0.14		0.42	16.48
Nairne	0.31	0.86	0.87	28.83		1	1 0 20	1 0	1 20 20
Mount Barker	0.45	1.35	0.89	30.93					
Echunga	0.28	0.97	0.77	32.83	South	AND S	OUTH E	AST.	
Macclesfield	0.35	0.92	0.74	30.72	C Dando	1 0 01	م م		1.05.00
Meadows	0.46	0.95	0.78	35.52	Cape Borda	0.21	0.46	0.56	25.09
Strathalbyn	0.35	0.72	0.69	19.28	Kingscote	0.18	0.43	0.44	18.95
					Penneshaw	0.48	0.74	0.55	21.34
Murray	ET ATS	AND V	TTTV		Cape Willoughby.	0.76		0.57	19-69
					Victor Harbor	0.26		0.66	22.18
Wellington	0.04	0.43	0.50	15-01	Port Elliot	0.17	0.53	0.66	20.33
Milang	0.08	0.55	0.54	16.08	Goolwa	0.21	1.19	0.60	17.93
Langhorne's Brdg	0.10	0.31	0.47	15.27	Pinnaroo	0.17		1.19	16.74
Tailem Bend	0.05	0.24		 -	Parilla	0.07			
Murray Bridge	0.12	0.51	0.50	14.32	Lameroo	0.10		0.71	16.55
Callington	0.11	0.53	0.56	15.65	Parrakie	0.09	1		
Mannum	0.25	0.27	0.41	11.67	Geranium	0.11		-	_
Palmer	0.29	0.55	0.66	15.60	Peake	0.08			1,77
Sedan	0.15	0.49	0.44	11.92	Cooke's Plains	0.12		0.42	14.74
Blanchetown	0.02	0.43	0.53	10.71	Meningie	0.06			18.87
Eudunda	0.11	0.67	0.55	17.33	Coonalpyn	0.14		0.48	17.49
Sutherlands	0.05	0.90	0.43	10.60	Tintinarra	0.17		0.71	18.78
Morgan	0.04	0.36	0.44	9.29	Keith	0.18			
Overland Corner .		0.09	0.58	11.42	Bordertown	0.38			19.76
Renmark		0.35	0.61	10.93	Wolseley	0.25	1.94	0.43	
Loxton	0.05	0.33			Frances	0.24	1.58	0.51	
	•		•	•	Naracoorte	0.30			
W	_ ~				Penola	0.44	2.17	0.80	26.78
West o	R. OLEN	CER'S G	ULF.		Lucindale	0.48	3 1.61	0.56	
Eucla	0.21	0.98	0.57	10.13	Kingston	0.57	1 1.55	0.61	24.73
White Well	0.07		0.55	9.67	Robe	1.22			
Fowler's Bay		0.33	0.46		Beachport	0.94			
Penong	_	0.57	0.84		Millicent	0.83			1
Murat Bay	0.02				Mount Gambier .	0.7			
Smoky Bay	0.06				C. Nrthumberland	1 .			
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THE AGRICULTURAL BUREAU.

CONFERENCE OF MID-NORTHERN BRANCHES.

The Annual Conference of the Mid-Northern Branches of the Agricultural Bureau was held at Gladstone on Wednesday, February 16th, 1916. The Minister of Agriculture (Hon. C. Goode, M.P.) was in attendance, and was accompanied by the Director of Agriculture (Professor A. J. Perkins), the Dairy Expert (Mr. P. H. Suter), the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.), the Wool Instructor (Mr. H. Jackson), Mr. F. Coleman (Chairman of the Advisory Board of Agriculture), and the Acting Secretary of the Advisory Board (Mr. H. J. Finnis). Mr. R. E. Lines, of the Gladstone Bureau, presided, and extended a hearty welcome to the visitors.

The following gentlemen represented the undermentioned Branches of the Agricultural Bureau:—Gladstone—T. Hollitt, G. M. Black, F. T. Reynolds, R. H. Coe, T. Mutter, G. A. Fisher, Wm. Growden, W. Odgers; Laura—R. J. Rose, E. G. Blesing, H. R. Lines, E. Peck, Georgetown—John Wyatt, M. H. Page, G. D. Inglis, W. A. Hill, G. E. Hill, E. W. Tucker, H. L. Tucker, J. N. Buchan; Wirrabara—J. Hollitt, W. H. Stevens; Booleroo Centre—W. Whibley; Port Pirie—F. A. Johns, A. M. Lawrie; Beetaloo Valley—P. Curton, A. G. Bartrum, J. Flavel, E. W. Berry, R. Heinrich, A. H. Clogg; Crystal Brook—J. R. Saltmarsh, George Sargent, M. P. Pavy, R. Heaslip; Canowie Belt—J. R. Carter, E. W. Noll; Tarcowie—G. G. Lines; Whyte-Yarcowie—J. E. Hunt, Geo. F. Jenkins; Belalie North—F. Bladon; Port Germein—A. Carmichael.

OPENING ADDRESS.

The Minister of Agriculture (Hon. C. Goode, M.P.), in declaring the Conference open, expressed the hope that any information which those present gleaned during the proceedings might be put into practical effect. In view of the war, expenditure had had to be reduced, and the activities of the Department had as a result been somewhat curtailed. After the conclusion of the war, if circumstances permitted, a vigorous policy would be put into operation.

Following on the drought, the wheat harvest was very gratifying, but the magnitude of the yield, coupled with the shortage of freight, had presented considerable difficulties in the marketing of the wheat.

THE WHEAT SCHEME.

The key to the success of the wheat handling scheme was the availability of vessels to carry the wheat to the market. A number of vessels had been sunk, and a very large number had been commandeered by the authorities for war purposes. As soon as the position had been realised by the Commonwealth and various State Governments, action had been taken in order to enable the wheat crop to be marketed to the best advantage. If this had not been done, shippers would have been able to secure only very little freight, and they would not have been in a position to negotiate for the purchase of the bulk of the wheat crop. No merchant, under the conditions which would have obtained, could have offered more than 2s, per bushel for the wheat. Up to the present very advantageous prices had been secured for the wheat which had been sold, but how long such prices would obtain, of course, could not be foretold, but so soon as a substantial proportion of the crop was sold, a further advance would be declared over and above that already made. The scheme had been entered upon with the welfare of the Commonwealth in view. Freight was not coming forward as freely as could be desired, but representation was being made by the Commonwealth Government to the Imperial authorities to secure as much freight as possible.

THE DEPARTMENT OF AGRICULTURE.

It was the endeavor of the Department of Agriculture to do all in its power to assist the farmers, including the carrying out of experimental work to solve such problems as were puzzling farmers. It was to be fervently hoped that there would be a repetition of the previous good season, and this would allow of the re-establishment of the flocks and herds which had been so sadly depleted by the recent drought.

He had much pleasure in declaring the Conference open.

SHEEP ON THE FARM.

This subject was dealt with in a paper by Mr. G. G. Lines, of the Tarcowie Branch. For a farm situated on rising country, with pastures that were not first class, he recommended the South Australian plain-bodied Merino. Dealing with the different types of Merino to be met with in Australia, he said the Tasmanian Merino and the New South Wales Vermont sheep resemble each other very much, both carrying very fine quality wool, very dense, generally short in staple, and on the small side. These sheep carry excessive body wrinkles, particularly the Vermont, and sheep carrying excessive leather do not thrive as well as the plain-bodied sheep. The fact of them being covered with a very fine quality wool taxes the

constitution to keep up the supply of yolk, as the fine wool generally carries more yolk than the coarser, and when hardships such as we have experienced in the previous years are met with dead yolk and tender fibre are the results. These two types of sheep, in the writer's opinion, are only suitable for green pastures.

The Victorian Merino, which has been introduced into South Australian flocks during the last few years, is a very attractive sheep, carrying nice quality wool, of good staple, and evenly covered, but it carries more wrinkles than the South Australian sheep. I am of the opinion that it is wise to avoid too much leather, especially body wrinkles, and fine quality wools, as there are a lot of fine and tender wools on the London market.

THE FARMER'S SHEEP.

The South Australian plain-bodied Merinos are the sheep for the farmers. These are covered with coarser wools, and strong wool means stronger constitution. On the farm, where the sheep are grazed on the roughest of the feed, constitution must be the first consideration. To get a large-framed sheep, generally speaking, you require a coarse-woolled sheep, as coarse wool means coarser bone and coarser skin. The strong, coarse, bulky wools when sold are always eagerly sought after, and command the higher prices. At the present time there is a shortage of these South Australian bulky wools on the London market.

STARTING THE FLOCK.

When the farmer purchases his sheep, if he is going to breed Merinos, I would suggest that he purchase a pure South Australian plain-bodied sheep, with not more than two folds on the neck, large tramed, and carrying an even fleece with plenty of bulk, and on the coarse side. A few shillings extra is never wasted in a good sheep if the farmer is going to breed, and lamb-raising must be a profitable proposition in the future. Too much stress cannot be laid on the importance of care in the selection of the ram. In all cases it is wise to know the sire's breeding for at least two generations on both sides, as some animals are attractive to the eye without any breeding, but when used as sires leave disastrous effects on the flock.

A good sire carrying a bulky fleece will build up a flock with bulky wool. Weight is then easily blended in by the selection of a sire carrying weight and plenty of lustre. When purchasing a ram the farmer should not consider a pound or so, as a good sire is cheap at £5, where a mongrel is dear as a gift. Under judicious selection a flock of over 500 can be grazed on a farm, and can be brought up to give a cash return in wool of about 16s. per head.

FAT LAMBS.

If in the opinion of the farmer his country is adapted for fattening, and he wishes to try the fat lamb industry, then I recommend the Lincoln-Merino cross. He should secure good Lincoln ewes, which are more prolific breeders than the Merino. A Merino ram with a fine quality wool and robust constitution should be obtained, and the ewe lambs will produce a finer class of wool than the progeny of Lincoln rams and Merino ewes, and in the writer's opinion they have less tendency to fence. If the ewes have to be hand fed the farmer will find the Lincoln ewe a more contented sheep, and one that will thrive better than Merinos under hand-feeding conditions."

The Minister of Agriculture emphasised the fact that flocks in South Australia were not of as high standard as could be desired, with the result that returns were not as satisfactory as they should be. It was only by individual effort that the standard could be raised.

The Chairman said that the prices secured in the markets proved conclusively that the better breeds of sheep were the more profitable to keep.

Mr. F. Coleman (Chairm, a Advisory Board of Agriculture) urged that sheep should be more generally kept by farmers. They were very valuable in keeping down the growth of weeds on fallow land, and the high prices now prevailing should be sufficient inducement to the farmer to stock his holding with sheep.

Mr. M. P. Pavy (Crystal Brook) said there were two factors governing the successful keeping of sheep, namely breeding and feeding. Careful provision should be made for the feeding of the sheep during drought periods.

SHEEP.

In an address under this title, the Wool Instructor (Mr. Henshaw Jackson) said that sheep had become very valuable, and present prospects indicated that they would become still more profitable in the future. Before long an opportunity should arise for the establishment of an extensive export trade in frozen meat from Australia to Europe. The present system of bare fallow practised by farmers did not allow of sheepraising on an extensive scale, and if farmers desired to go in for sheep, the questions of providing fodder and the methods of feeding would require their serious consideration. The operations of the farmer in connection with sheepraising could not be based on the methods adopted by the pastoralist, whose conditions were totally dissimilar, and it would be necessary for the farmer to study closely the conditions obtaining on his farm.

BREEDING

All men would not be successful in their efforts to breed sheep of high quality, and it would be best for the average farmer to utilise the products of the successful breeders instead of endeavoring to breed up a type of sheep on his own account. The farmer required a sheep which would provide mutton for himself and produce a good class of meat for marketing. For that purpose the crossbred was the best. The South Australian Merino was as nearly as possible a general purpose sheep, and its constitution left little to be desired. In commencing breeding, pure-bred sheep were necessary, and in crossing pure-bred sires were absolutely essential. It was important to secure sires from a flock, the breeding of which was on correct lines.

FEEDING.

In regard to feeding, the value of lucerne should be realised, and, wherever the conditions were favorable, lucerne should be grown in sufficient quantity to enable the farmer, with the aid of straw chaff and cocky chaff, to provide a quantity of feed for the sheep.

For producing fat lambs, the Lincoln-Merino cross as a mother had given very good results. The Leicester-Merino cross were also very successful, and the wool was of very good quality. The Romney Marsh produced a good half-bred ewe, but were more suited to damp country. The Southdown ram was a good carcass and wool producer, and for quick returns the Dorset Horn was to be recommended. The provision of shelter was of some importance. Farmers would do well to interest their sons in sheep raising, as they would probably become enthusiasts in the work.

The Minister drew attention to the necessity for conserving fodder in times of plenty to guard against shortage in drought periods. Every farmer should store as much fodder as could be spared. There would then be no depletion of stocks such as occurred in the recent drought. Stock-raising should become of such importance that the present methods of harvesting would be superseded, the binder taking the place of the reaper. The co-operative purchase of a thresher could be undertaken by a number of farmers, and this practice would make available a much larger quantity of fodder. Mr. G. F. Jenkins (Whyte-Yarcowie) said that he had undertaken the growing of lucerne with very gratifying results.

Mr. W. Odgers (Gladstone) proposed, and Mr. G. A. Fisher (Gladstone) seconded a vote of thanks to the Minister for his services to the conference, and the proposition was carried by acclamation.

Afternoon Session.

An address dealing with "The Force of Heredity" was delivered by the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.). The text of this will be found on page 724 of this issue.

THE DAIRYING INDUSTRY.

Mr. T. L. Giles (Laura) contributed the following paper on this subject:—To start a dairy farm a man needs an area on which to grow plenty of feed suitable for milking cows. Especially during the summer months it is necessary to have green feed, such as lucerne, maize, or sorghum. It is always better to have some of each, to give the cows a change of food; but it would be hard to get a more suitable food than lucerne, especially if you give the cows one feed a day of bran and chaff and molasses; say 8lbs. of chaff, 4lbs. of bran, and a pint of molasses. This, in change with lucerne and a little ensilage, will ensure a good supply of milk during the summer months. It is always well to get seed in to catch the first rains, so as to have early green feed to take the place of lucerne when the cold weather comes. Arrange to have plenty of feed all through the year. To be short for a month means that your cows go back and almost go dry. Once this happens it is very hard to get them back to the usual standard. In fact, in many cases if you let the cows go dry you lose several of the most profitable months from the cows.

THE PROFITABLE COW.

It is the cow that keeps up the flow of milk the year round that is the most profitable, not the big milker that goes dry after a few months, and wants four or five months' rest out of the 12.

I would like to point out how necessary it is to keep only good cows. Owing to the searcity of dairy cows just at present this is somewhat difficult. There is only one thing to do; that is, breed your own stock, but only breed from the best. Do not be satisfied to say: "That's a nice heifer calf; I'll keep her." Have your cows tested, feed them well, and only keep calves from those that put up a satisfactory test. The testing of the cows is one of the most important points which go to make the industry a success. Set a standard for the cows, allowing them from six weeks to two months dry. To my mind a cow that will not give 500galls, to 600galls, of milk a year, making from 250lbs, to 300lbs, of butter a year, allowing a spell of, say, two months out, is not worth keeping.

By the time we take the cost of feed, labor, etc., we find ourselves out of pocket, and it means that all the cows make above this standard is profit, and all they are below is loss. It is a good deal of trouble to keep account of your year's records, but you can get a good idea by weighing and testing once a month, and allowing for heifers to improve, and the amount of feed you give the cows. It can be done without very great expense, and where you have to depend entirely on the cows for a living careful testing and grading is well worth the trouble.

THE MILKING STRAIN.

To get the best results from the cows it is necessary to breed cattle that are from a good milking strain, say, Jersey or Ayrshire, or, if you want to sell milk, Holsteins. But whatever breed you go in for, you should only keep pure-bred bulls from cows with heavy milking tests. If you keep the sire pure you are keeping up the blood, which is most necessary, for calves from good tested cows, but bred from a sire which is not pure bred cannot be expected to improve the stock. I think the most important thing is to make up your mind what breed of cows you are going to keep, and get a purebred sire of that breed; but when you want a change do not sell your Jersey and get a Holstein or Ayrshire. Get another Jersey of different blood and your herd of cows will soon begin to show a I think just as good a cow may be got by crossbreeding; but the trouble is we do not stop at the first cross, and soon have no breed at all. We see this in every class of stock, even poultry. Then again, if we keep to the one breed of bull we soon get cows much alike, which is a benefit in many ways; for instance, one breed of cattle needs more feed than another, and if we have several classes of cattle they need different amounts of feed accordingly.

After getting a herd of good cows it is most important to handle them quietly and kindly. To knock cows about is as bad as half feeding them. Boys or men who cannot handle cows quietly are of no use to a dairyman, for this soon spoils the cows that are of a nervous nature.

THE MARKET.

After getting the milk we must get the best prices for it, and this is one thing that often disheartens men. They have to take such low prices for their cream or butter; but in most cases it is their own fault. They are not careful enough about their separator, cream cans, etc. Milk and cream are easily affected, and, once turned, are of little value. The separator should always be scalded after using. Cream should be kept in a cool place, but allowed plenty of fresh air. It means a lot to a dairyman if he has to take 9d. instead of 1s. per lb. for his produce because it is of inferior quality, which is often the case for want of care and attention. In conclusion, if we keep

these few things in sight: 1st, careful breeding of stock; 2nd, testing and selling off cows not reaching the standard milk and butter test; 3rd, careful feeding and handling of cows; 4th, cleanliness in every department, we shall find dairying a most profitable industry.

THE DAIRY EXPERT'S OPINION.

The Dairy Expert insisted that the farmers should keep only good cows. In the selection of bulls, also, it was necessary to ensure that besides having a good pedigree, a bull should have a good record. On testing hinged largely the success of the dairy herd. It was very necessary to ensure that the animals kept gave a fair return for the capital they represented. Testing was a very simple matter, and the Department was willing, at a nominal cost to the dairyman, to Through insufficient care being taken with undertake the work. the dairy products they frequently realised very low prices. use of preservatives was to be absolutely condemned. Their use was unnecessary if proper care was taken in the dairy; and where milk was distributed for consumption by infants the use of preservatives would result in the death of many of them. Quantities of cream which were separated on different days should not be mixed together, as the practice hastened fermentation. In reply to a question, Mr. Suter said that the last milk drawn from the cow at a milking was the richest in butter fat.

1917 CONFERENCE.

Mr. R. J. Rose (Laura) extended an invitation to hold the next Annual Conference at Laura, and Mr. E. G. Blesing (Laura) having supported, it was unanimously decided to accept the invitation.

SMUT IN WHEAT.

Mr. F. Coleman (Chairman Advisory Board) referred to the prevalence of smut in wheat, and recommended that pickling of seed should be undertaken a little while before sowing, so that the grain would become thoroughly dry before it was required. Great care should be exercised in the process to ensure that the grain was thoroughly treated. He suggested that delegates should convey to their respective Branches a recommendation for the more thorough pickling of seed for the coming season. The Minister endorsed Mr. Coleman's remarks

The Director of Agriculture (Professor A. J. Perkins) said that the best method of pickling was to thoroughly shovel the wheat over on a floor, after having thoroughly wetted it with a one per cent. solution of bluestone.

VETERINARY DEMONSTRATION.

The Conference then adjourned to an adjoining yard, where the Government Veterinary Lecturer gave a practical demonstration of veterinary surgery.

THE LOCAL PIG INDUSTRY.

The evening session was taken up by an address by the Director of Agriculture (Professor A. J. Perkins), who dealt with the local pig industry. A report of the Director's remarks will be found on page 703 of the present issue.

VISITORS ENTERTAINED.

At the close of the Conference the visiting delegates and officers of the Department of Agriculture were entertained in the Parish Hall by the Gladstone Branch. A lengthy toast list was honored.

MARKETING THE RABBIT.

"If some simple method of preserving or curing rabbits on the farm could be adopted, it would be a good thing, as many thousands have to be trapped on the farms in this district every year, and are simply of no value, except for the skins," writes a correspondent at Yabmana. "Is there any method of preserving rabbits, so that they could be dry packed in boxes or bags, like cured bacon, and sent to Adelaide in a saleable condition, say, once a month?" he asks.

The Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) says, in reply: "Rabbits could be salted down for market, but would be dry and unpalatable. The method would be a layer of salt, with 2 per cent. saltpetre, rabbits rubbed with same and covered till box was full. Sales would hardly cover cost. Wet pickling as for fresh pork would put them on the market in a more palatable form, but the redness resulting from pickling would tell against their sale. If they are in their thousands a small co-operative canning plant would be the best way of dealing with them, if they are fleshy enough. In this form they could be marketed abroad, and probably bring remunerative prices."

AGRICULTURAL BUREAU REPORTS.

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	Page	Mar.	April.		Page	Mar.	Apri
Amyton	*		_	Georgetown	*		
ingaston	*	-	-	Geranium	*	25	29
Appila-Yarrowie	*			Gladstone	*		
Arden Vale & Wyacca	*			Glencoe	*		
Arthurton	*			Glencope	*		
Balaklava	*			Goode	*		
Beaufort	752		- 1	Green Patch	758		
Beetaloo Valley	‡	20	17	Gumeracha	*		
Belalie North			-	Halidon	762		
Berri	+ +	22	19	Hartley	765	15	12
Blackwood	*	-		Hawker	*		
Blyth	†			Hilltown	*	-	
Bookpurnong East	+ + + *		_	Hookina	751	14	18
Booleroo Centre	*	-		Inman Valley	*		
Borrika	*			Ironbank	*	18	15
Bowhill	*			Julia	*		_
Brinkley	*			Kadina	*		
Bundaleer Springs	*			Kalangadoo	†	11	
Burra	*			Kanmantoo	765	18	13
Bute	*			Keith	*		
Butler	*			Kingscote	*		_
	*		_	Kingston-on-Murray.	*		_
Caltowie	*			Koonibba	*	14	1
	*			Koppio	758	14	18
Carrieton	*			Kybybolite	*	16	13
Carrow	764	14	18	Lamaroo	764	10	1.0
Cherry Gardens	*	1.4	t .	Lameroo	753		
Clanfield	155			Laura	756		-
Clare	765	20	17	Leighton	# #		_
Clarendon	760	20	1. 6	Longwood	769	1	1
Claypan Bore	100			Lucindale	1 .	16	1
Colton	*			Lyndoch	1 +		-
Coomandook	*			MacGillivray	766		
Coomooroo	*			Maitland	*	-	-
Coonalpyn	*			Mallala	*	6	
Coonawarra	*	_	_	Mangalo	1	_	-
Coorabie	*		_	Mantung	762	1.4	-
Cradock			-	Meadows		14	1
Crystal Brook	753	_		Meningie	767		-
Cygnet River	765	i —	_	Milang	767	11	1.
Davenport	*	-	_	Millicent	*	14	1
Dawson	*		-	Miltalie	1	18	1
Denial Bay	*	-		Mindarie	*		-
Dowlingville	*			Minlaton	*	-	-
Elbow Hill	*	-		Mitchell	*		-
Forest Range	*			Monarto South	761	_	-
Forster	*	-		Monteith	*	-	-
Frances	*	-		Moonta	757		-
Freeling	*			Moorlands	*	_	-
Gawler River		1	1	Morehard	751	18	1

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^{*}No report received during the month of February. + Formal report only received.

‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings— March 8th and April 5th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

HOOKINA (Average annual rainfall, 12in.). February 15th.—Present: six members and three visitors.

FARM GATES.—In a paper on this subject, Mr. B. Murphy said the most suitable gate for ordinary purposes was the double gate, each section of which should be 6ft. or 7ft. wide. Stringybark timber 3in. x lin. was to be recommended, and the gate should be built with the two upright and four cross pieces; it was an advantage, also, to have two cross-corner stay pieces fitted to each gate. One gate should open inwards, and the other outwards, and the posts on which they were hung should not be used for straining posts in the fence. For openings wider than 14ft. the wire gate, made of four or five wires, with a couple of wooden droppers and tightened up with a 3ft. wooden lever was best. Mr. Kelly did not approve of wooden gates. Mr. Stone favored iron gates, but would not recommend double gates. Mr. Madigan said wooden gates were serviceable for sheep, but for horses and cattle iron gates were much to be preferred. He preferred pipe gates to flat iron gates, as the latter were too heavy.

MORCHARD (Average annual rainfall, 11in. to 12in.). January 22nd.—Present: seven members and two visitors.

Sparrow Pest.—The Hon. Secretary (Mr. H. G. Kupke) read an extract on this subject. Mr. E. J. Kitto referred to the difficulty in inducing sparrows to take poison at a time when grain was so abundant. Mr. W. Martin suggested the use of poisoned water placed in wire netting enclosures. Mr. G. Parsons said that the use of strychnine poisoned water was very effective. Mr. G. Gregory said that sparrows should be fed with good grain or clean water in a wire netting enclosure near the fowlyard regularly, and when they became thoroughly accustomed to it, poisoned grain or water could be substituted with excellent results. The Chairman (Mr. R. Jasper) had found poisoned water most effective in the summer and poisoned grain in the winter. Mr. R. Kitto made it a practice to destroy all nests and young in the breeding season and supplemented this by poisoning the grown birds. United action by the landholder and householder should have some effect in subduing the pest. The Hon. Secretary suggested that the sparrow should be made compulsory.

QUORN (Average annual rainfall, 13.78in.). February 19th.—Present: seven members.

Thatching and Covering Haystacks.—In a paper on this topic Mr. Noll referred to the loss which would occur if heavy rains should fall whilst haystacks were unprotected. His practice was to cover the stack with loose straw, having driven spikes into the stack at the eaves to prevent the straw from slipping. The straw should be built to throw the water outwards, and should be held in position by wires, about 4ft. apart, the ends of which should be weighted with posts. He had found this method very satisfactory. Mr. Brewster preferred thatching the stack thoroughly with wet straw. The practice of covering with loose straw, weighted, allowed the formation of hollows, which permitted the penetration of water into the stack. Messrs. Britza and Schulzee supported the practice of covering stacks with loose straw. If plenty of straw were put on, ample protection was

afforded, and the straw itself could be used for feeding purposes. Opportunity was taken to farewell Mr. James Cook, a life member, who is leaving the district. Members referred to his excellent record of 20 years' service in the Branch.

WIRRABARA (Average annual rainfall, 18.91in.). January 22nd.—Present: 18 members and one visitor.

NOXIOUS WEEDS .- Mr. P. J. Curnow contributed the following paper on this subject:- "Although South Australia possesses a large number of useful grasses and fodder plants, many weeds of an unprofitable character are also produced. digenous plants of the latter quality, generally, are easily kept under control, for it is a fixed rule in Nature to disallow certain plants, in common with animals, to increase to an undue extent. There are always counteracting influences that prevent Whilst, therefore, one class of plant or animal from out-stripping its fellows. these influences are at work, producers in this State do not have an unwarranted amount of difficulty in keeping in check those noxious native weeds that infest our lands from time to time. The greatest difficulty is experienced, however, with weeds that have been imported from foreign countries. It is very curious, but the fact has been noted very many times, that certain weeds that have become nothing less than a curse in this State when introduced here, in their country of origin give very little trouble. Our climate is such a genial one that these introduced strangers flourish apace when they became established. In this connection, mention may be made of Cape dandelion, star thistle, stinkwort, Salvation Jane and others. all such introduced weeds the common star thistle, in this district at least, is the In late years this has spread in an alarming manner all over the worst pest. Had district councils and private landholders been fully alive to their own interests and those of the public 10 years ago, the difficulty could have been checked, but through their neglect and apathy the weed has now gained such a hold on large areas of valuable land in this district that in many cases it is now impossible to eradicate it without very heavy expense. To prove that this thistle impossible to eradicate it without very heavy expense. may be completely controlled and even eradicated, the writer may mention that it appeared in his locality 12 years ago both on the district road and on private property. The plants were watched and for three seasons destroyed, and in that time not a plant seeded, and for many years the infested areas have not grown a plant. Had these early plants been neglected this neighborhood would have been covered This season complaints from farmers everyas are larger areas in this district. where are common, for the star thistle causes more annoyance than any other weed in a standing crop. Among our introduced weeds may be mentioned, wild turnip, mustard, soursob, stinkwort, and 'Salvation Jane.' If these plants are destroyed upon their first appearance in a district they can be checked if not eradicated, but in attempting such control the fact must be always kept in mind that once seeding takes place special care is necessary in keeping watch over infested areas, as many seeds which fail to germinate in one season if conditions are not favorable will do so two or three years later, when the landholder may think that cradication has been effected. The writer has proved the above many times, particularly in connection with the stinkwort pest. The worst noxious weed carriers are sheep. On an old sheep camp all kinds of strange weeds will appear. On one in this locality Salvation Jane has appeared for a number of years, although no new seed has been allowed to ripen for quite six or seven years the plant comes up annually, though gradually getting less. Two years ago a travelling mob of sheep distributed star thistle seeds along one district road, where none had before grown, and now this road has to be watched to prevent the plants seeding." A resolution was carried by the members that district councils should use every effort to effectively carry out the provisions of the Noxious Weeds Act.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BEAUFORT.

January 20th.—Present: five members.

HARVEST NOTES.—Mr. W. W. Mugford found that King's Early and Gluyas Late made good hay; he preferred early to late varieties for sowing on stubble land. The complete harvester was less expensive to operate than the stripper and win-

nower, whilst labor was too scarce to allow of the employment of the thresher. Mr. W. B. Sampson had found that horses did well on hay grown from self-sown grain; the lay should be cut as scon as it came into car. He was favorably impressed with the work of the reaper-thresher, which, he thought, could be used for threshing after the binder. Mr. W. Veitch favored the wide harvester for taking off a crop.

CRYSTAL BROOK (Average annual rainfall, 15.62in.). January 22nd.—Present: 18 members.

EXPERIMENTAL WORK.—The Hon. Secretary of the Experimental Committee (Mr. R. Heaslip), presented the report on the harvest results of experimental plots. Mr. H. Sutcliffe read a paper from the Journal relating to the management of the horse. Mr. W. J. Venning emphasised the need for thorough cleaning and grooming of the horse. Mr. Heaslip said that it was an excellent plan to teach a young foal to go into a loose box when the mare was taken out to work. If given a feed of bran when shut up the foal would soon become accustomed to it and would be more tractable when weaning time came. He advised the breeding of a few foals each year, so that old stock could be regularly replaced by young. When breaking in colts, the more quietly they were handled the better would they be, so long as they were thoroughly mastered. Mr. A. H. Frith also spoke. A committee was appointed to draw up a programme of work for the coming year.

LAURA. January 21st.—Present: 15 members.

FRUIT TREES SUITABLE TO THE DISTRICT.—The Chairman (Mr. E. G. Blesing) He said:-"There are great differences in the read a paper on this subject. various parts of the district. For example, on the western side of the Rocky River almost every kind of fruit tree will do fairly well, even without irrigation, but on the eastern side the choice is very limited, the rainfall being less and the underground water, although plentiful, has during the last 20 years deteriorated very much, and seems to be only suitable for lucerne, sorghum, and hardy vegetables. However, my experience has been that peaches, apricots, and the hardy varieties of plums do fairly well, especially if the garden has a good breakwind on the northern side. I have had several young, healthy-looking trees killed by one hot wind owing to the absence of a break on the northern side. Pears seem to do fairly well in Laura, and do not appear to suffer from the brackish water, as they bear heavy crops of good quality. Years ago oranges grew splendidly, and produced fruit of good quality, but of late years they had been going from bad to worse, and it will not be long before they are all doomed, as they are gradually dying back in spite of all the watering; the deterioration of the water supply is responsible for the failure. Figs, grape and current vines are giving the most satisfaction. Of late years, however, the bird pest has so increased that the growing of this fruit will prove unprofitable unless simultaneous action is taken to destroy them, for even now it is impossible for any grain or seeds to mature, as both sparrows and starlings have acquired a taste for everything in the garden. There is one fruit tree, the growth of which is very much neglected in this district, and which is least exposed to bird and other garden pests, namely, the almond. It is the hardiest of all trees, will grow well in almost any kind of soil (from lime-stone to the richest alluvial) and from a profit point of view it will pay as well as any other, as it requires very little attention or labor after planting. If instead of all the boxthorn hedges that were planted in Laura years ago, almonds had been planted it would have been much more profitable, and last year's flood would not have done the damage it did owing to the water being banked back by the As a shelter or breakwind almonds are perhaps not quite as good as other trees or shrubs, but if every farm homestead was surrounded with a double row of almond trees it would be both ornamental and a source of profit, for I am sure that there is not a homestead within 30 miles of Laura where almonds would not grow and do well. The mulberry is another fruit that does well in this district and is not affected by the brackish water. I have tried for two years to grow walnuts in Laura, but they proved a total failure, as the first hot windy days burnt the young shoots, and then the trees gradually died. I venture to Lay that given a good supply of water and a breakwind on the northern side, almost every kind of fruit could be grown in Laura. As to vegetables, both in winter and spring, every kind can be grown to perfection, but with summer vegetables it is

very different, except with tomatoes, which do very well. I have tried nine different kinds of French beans without success, as on account of the water they gradually pine away. With cucumbers I have had the same experience. The only bean I have tried that thrives well is the so-called "Seven Year" or Tonga bean, but it comes into bearing late in the summer." In answer to Mr. H. R. Lines, Mr. Blesing said that, in his opinion, there was an almost unlimited market for When farming at Bangor a break was planted around the garden, and as much as £19 per year was made from the trees. Mr. Sandow referred to an almond tree at Yangya from which fruit to the value of £5 was produced in one year. Mr. G. Bundey said that almost any kind of fruit tree would grow in the Laura The difficulty which confronted them was the effect of the climate, and of late years the underground water supply had proved detrimental to many of the This was due to the presence of magnesia in the well supplies. had a good deal to learn about irrigation. He was of the opinion that a good soaking would do trees more good than sprinkling. He had watched some of the gardens in this district for a number of years and had seen some do very well for a few years, and then they would go back. The hardy varieties, such as the fig, the mulberry, and the almond did well almost anywhere. Mr. J. Sibly questioned the view that the growing of oranges was doomed in the district. For about 30 years in the Riverside Garden oranges had been grown, and it was well known that that garden produced in past years oranges of excellent quality. While it was true that during past years oranges did not produce good crops, he was of the opinion that the district could successfully produce oranges. In other parts of the State, owing to the prolonged drought and other causes, orange crops had been a failure. This being the case he was hopeful that local orangeries would come into profitable bearing in the near future. Mr. J. C. Richardson said a question which required serious consideration was why trees which had borne well for so many years should now prove unproductive. Things essential to successful fruitgrowing were:—(1) A good break; (2) water supply; (3) cultivation. He was satisfied that they had a great deal to learn yet about the value of cultivation and also about irrigation. He recently read an article in the Journal of Agriculture which emphasised the fact that it was possible to kill, through over irrigation, the bacteria in the soil, while proper cultivation promoted the growth of bacteria. He was of the opinion that, owing largely to last year's flood the salts in the soil had been washed down to the roots of many of the fruit tres in the district, and this oversupply of salts accounted for the poor yields of fruit. They should endeavor to solve the problem of what fruit trees could be depended upon, as there was nothing more disappointing to an orchardist than to plant trees and to discover after a few years that they went back or ceased bearing. The almond, fig and mulberry were safe fruits, but what they wanted was a juicy fruit suitable for the summer. Mr. J. F. Roennfeldt did not think that orange growing was doomed in the Laura district. After the last flood he thought that all the gardens in the district would benefit by it, but such had not been the case. The ground had set as hard as rock in some instances. was of the opinion that stone fruits would do well for a time, but the underground water supplies had become so impregnated with salts and magnesia that trees were Since the drain was constructed the quality of the water had deteriorated for gardening purposes. The solution of the fruitgrowing industry in the district was the securing of a good water supply. The land was rich enough, but good water was lacking. He was satisfied that oranges would thrive well for a few years, but the well water injured them in time. Trees should not be watered near the trunk, but a good distance off, so that water would soak through the ground to the roots. Mr. Sandow said that during last year oranges at the Riverside Garden had not done well. After rain the leaves would shoot, but they soon He was experimenting in connection with the cultivaafterwards dropped off. tion of the land around the trees. Mr. W. Stevens asked whether any members could explain why trees that had been planted within the past few years did not thrive as trees which had been planted, say, 20 years ago. He had on his property some old trees which bore well, while young trees did not thrive at all. would also like to know how often trees should be watered. In the Wirrabara district the rule was to water only twice a week, but in Laura he had found that the ground became hard and dry almost immediately after watering. Mr. B. Lines was satisfied that a lot of water was wasted in watering trees. had seen watering done by means of underground channels. In Victoria he When water was run over the surface it was possible that about two-thirds of it was wasted.

SPALDING (Average annual rainfall, 20.25in.).

November 19th.—Present: 13 members.

ARTIFICIAL MANURES.-Mr. M. A. Dowd contributed a paper on this subject. He said that it was possible for continuous cropping of land accompanied by the use of only one manure to eventually cause an exhaustion of the soil. The majority of farmers dealt with only one class of fertiliser, viz., phosphates; this supplied phosphoric acid, and the wonderful results which followed its application indicated that soils were lacking in that element. When the use of the superphosphate was first adopted and the farmers made use of the fertiliser drill to apply it, it became necessary for them to work their land better to allow of the successful operation This better working of the land was no doubt partly responsible for the increased yields obtained. It was necessary for a farmer to ascertain by experiments what plant foods his soil lacked; lands, say two chains wide, and the length of a paddock, should be sown separately with different fertilisers such as sulphate of ammonia, and the results carefully noted. Allowance should be made for climatic conditions, and conclusions should not be prematurely drawn from the Three essential plant foods were nitrogen, potash, and phosresults obtained. phoric acid, and if any one of these was absent from a soil, no growth would take place, and no vigorous growth unless there were an abundant supply of all three Farmers should not labor under the impression that these fertilisers were merely stimulants; they were essential to the growth of the plant if insufficient quantities were available in the soil. It was possible to determine the constitution of a soil by analysis, but this was not always reliable, and the better method of ascertaining the food deficiencies of a soil was by practical test. would be well for farmers to test their soils with a nitrogenous fertiliser to see whether they responded to its application. Good tillage assisted in maintaining the nitrogen content of soils, and the growth of legumes, such as peas, ploughing in of green stuff, &c., all assisted in that direction.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

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CLARE (Average annual rainfall, 24.30in.).

January 21st.—Present: 11 members.

FROSTS.—The following paper on this subject was contributed by Mr. M. L. Nolan:—'For many years our district enjoyed immunity from frost in its severer form, so far at least as damage to our vines was concerned, as it is only late frosts However, severe late frosts in three seasons out of the we have reason to fear. last four have caused heavy loss to our viticulturists. A feeling of apprehension and insecurity is ever with the man concerned in viticulture, for immunity from frost cannot be guaranteed. It becomes a question, then, whether anything can be done, and if so by what means, to prevent or lessen the damage arising from A few figures showing the extent of the industry and the financial loss suffered in these years will be pertinent and may prove surprising. Clare and surrounding districts there are 2,541 acres planted in vines, of which 1,510 are wine grapes and 1,031 drying varieties, mainly currants. I shall say nothing as to the loss of wine grapes, but confine myself to the dried fruit varieties, as I am in a position to get these figures very nearly accurately. In 1912, taking the figures of the Dried Fruits Shed as a basis, there was a loss of 200 tons. 1914, following on the drought a very severe frost occurred in October, from the effects of which the drought-stricken vines could make no recovery. Some may think that owing to the terrible and unprecedented nature of the season, there would have been no crop in any case, but I am satisfied this is not so. Growers who escaped the frost had quite respectable tonnages, and the yield of wine grapes confirms my belief. I estimate the loss at 60 tons. In the present year, at least 150 tons were swept away. Thus in three years 410 tons have been lost. the gross return at £40 per ton, it will be seen that growers have lost £16,400, of which a very large part would have been paid out as wages, and practically the whole circulated in the district. Thus, not only the grower, but the worker and business man also suffer. To overcome the effects of frosts most growers who do anything at all, pin their faith to fires, although very many do absolutely nothing. But even as regards fires, we do not know whether they should be started early in

the night and kept going continuously so as to prevent the temperature reaching freezing point, or in the early morning so as to create a curtain of smoke and thus Then the system of building a few large fires seems unobscure the sun's rays. A series of small ones arranged methodically through the rows satisfactory. This leads to the question of what could be appears the more reasonable way. It should prove of advantage were the Government to obtain inused for fuel. formation as to the methods adopted in the older vine countries of Europe, where, so I understand, it forms part of the year's routine. And concerted action by all growers would surely be beneficial." Mr. Lewcock thought the haphazard effects of frosts-parts of the same garden escaping and others being burnt, although all on the same level-were due to broken clouds and tree shadows. garden escaped owing to the timber. He thought thick smoke would be a preventive, and advocated trees being planted to provide shade from the sun. connection olives would serve a double purpose. The Hon. Secretary (Mr. P. H. To create a blanket of Knappstein) did not think the sun caused the damage. smoke at sunrise was useless. The damage occurred when the plant tissue was frozen, and fires, if used at all, should be started early, with a view to preventing the atmosphere reaching freezing point. From what he had seen, he believed in very early cultivation, and then leaving the soil alone until the danger time had Gardens so treated had escaped, whilst others freshly stirred had been Mr. F. Knappstein thought the damage was done by the actual freez-Fires should be useful if started before that point was reached, but to have ing. the desired effect they should be small and numerous, not few and big. America oil, in lamps, was used. Mr. Ward thought smoke was useless. was wanted was a circulation of air by numerous small fires. To depend upon a few Mr. Walden did not believe there was anything in large ones was a mistake. early versus late cultivation. A strong current of air should be created to avoid the effects of frost. Mr. E. Kelly had seen non-cultivated ground affected equally Mr. Stancliffe believed neither clouds nor smoke were any good. with cultivated. From his own experience early cultivated ground came off far better than that recently stirred up; fires were good, but should be started before frosts set in. Mr. Robinson believed in very early cultivation, the ground then to be left until the danger was past. The Chairman (Mr. W. Pattullo) said that whenever a frost was followed by a bank of clouds before sunrise the gardens escaped. cock recommended that growers take note particularly of where the shadows fell, and the results on the vines. It was resolved to seek the assistance of the Government and the Agricultural Department to ascertain the best means of combating the effects of frost.

LEIGHTON (Average annual rainfall, 16in. to 17in.). December 18th.—Present: 10 members.

CO-OPERATIVE STORAGE AND SALE OF WHEAT .-- Mr. J. F. Hogan read the following paper on this subject:- "The system of storing wheat with wheat-buying firms cannot be recommended as a good business proposition from a farmer's point of It is the custom to sell for each for immediate requirements, and speculate with the balance stored with the buyers. By so doing, competition is greatly reduced, as a buyer cannot be expected to bid a very high price for wheat which he has in his possession. Storage of wheat allows the buyer to extend his operations far beyond the extent his capital would allow if the transaction were on a cash basis, and restricts the farmer's operation proportionately, as his own capital is used against him in such a way as to greatly reduce competition, as the buyer has both the wheat and the money. Farmers cannot store in their own barns, as when prices are suitable ordinary farming work interferes with the carting of wheat. Therefore they should secure stacking ground at the stations and store their surplus It may be said this would be expensive, but farmers pay all commissions and charges indirectly under the present system. We know that large parcels of wheat command a higher price than small lots. A gentleman who has checked hundreds of thousands of bags of wheat assured me that he considered the average gain in weight between country and city would easily amount to 4lb. per bag. This item alone, on 20,000 bags amounts to £220, and added to this the increase in price gained by selling in large parcels we would have sufficient money out of the scheme to pay all wages and charges, and then leave a large profit, with the added value of better competition in the wheat buying season, and a more satisfactory system of At present all produce bought or sold by farmers is weighed for them,

and not always to their advantage. To make a success of this scheme it would be necessary for sufficient members to pay enough money in advance to finance it and balance up at a stated time every year, to allow old members to realise their profit and loss, and to admit new members. This is a form of co-operation we should try to bring about, rather than undermine existing societies, societies whose value we would quickly realise should they suspend operations. Should this scheme be deemed unworkable, we should try and get a stated advance from wheat buyers, as it is unjust that the buyer should have the use of so much money free of interest. while the farmer has to pay interest on money from the banks on his cartnotes. Should the Agricultural Bureaux go on with local co-operation as practised by the Clare Branch, one committee could manage the two schemes, and one scheme would Without universal acceptance of one or both the schemes, tend to help the other. failure is certain, as isolated attempts will meet with discouragement at every turn, from those who are quite satisfied with existing arrangements.

WATERVALE, February 11th.—The Chairman (Mr. E. E. Sobels) spoke in appreciative terms of the work of the Hon. Secretary (Mr. J. R. Hamp), who has enlisted for service with the Expeditionary Forces. Messrs. A. Burgess, H. Baker, D. Guthrie, W. Smith, and C. W. Grace endorsed the Chairman's remarks, and Mr. Hamp responded.

YORKE PENINSULA DISTRICT. (TO BUTE.)

MOONTA (Average annual rainfall, 15.22in.). February 19th.—Present: 14 members and three visitors.

Pigs.—Mr. W. J. Brinkworth contributed a paper on this subject. shire, he said, was noted for its good qualities and ability to produce fine streaky The White Yorkshire was a good pig, which grew to a large size, and also produced excellent bacon; the Mid-Yorkshire, not so large as the Yorkshire, was also to be recommended. The Poland-China was quiet, a good mother, and a good doer. The Essex pig was easily kept fat. The Red Tamworth was a lean kind with a very long head, used to some extent for crossing with the fatter breeds. these animals, good roomy sties should be provided. They should be well drained, and have high roofs in order to be cool, and also to permit of easy cleaning. Breeding sows should be kept in large sties, and when about to farrow should be put into separate sties, which should have a protective railing around the sides, about 8in, high, and 16in, from the walls, in order to prevent the sow lying on her young. The sows should be given a little bran, possibly with the addition of a little easter oil, about a week before farrowing, and for the first day after this little feed should Afterwards, however, they should have plenty of food with a little bran in it. After the young pigs were weaned they should be well fed in order to bring them to marketable condition in as short a time as possible. Young boars should be castrated when from four to five weeks old, as they were then more tractable and thrived better. Breeding sows which did not have at least nine pigs at a litter should not be retained; breeders should endeavor to secure two litters per year from each sow, and should keep only good mothers, and unrelated boars from which The large Yorkshire boar and the Berkshire sow made a good crossbred, as also did the Poland-China boar and Berkshire sow. The Mid-Yorkshire boar and Poland sow could well be crossed, and the Tamworth boar-Essex sow cross had proved a good pig. Mr. W. B. Stacey said that the Essex pig crossed slightly with another breed would increase in weight very quickly. The Tamworth pig was the best for factory purposes; the Berkshire required a lot of food, and the fibre of the meat was too coarse. Mr. James Cooper thought that a quantity of offal was necessary to the profitable keeping of pigs. Mr. A. B. Ferguson thought pigs could be profitably kept by every farmer; he recommended the feeding of crushed corn, damped, as more economical than whole grain. The most profitable time to sell the young pigs was as soon as they were weaned. Mr. T. H. Hooper said the best meat was obtained from a Tamworth boar and Berkshire sow crossed. Soaked corn was better than crushed corn for feeding. After three years' experience he was of opinion that pig-keeping was unprofitable.

WESTERN DISTRICT.

GREEN PATCH (Average annual rainfall, 26.56in.). February 14th.—Present: nine members and one visitor.

Homestead Meeting.—The meeting was held at the residence of the Chairman (Mr. C. J. Whillas), who gave an able demonstration of the working of a petrol

engine.

RABBIT DESTRUCTION.—Some discussion took place on this subject, and members unanimously supported the Koppio Branch in its contention that a Government Inspector should be appointed to see that landholders of the district complied with Mr. E. M. Sage also contributed a paper on the questhe provisions of the Act. tion, in which he emphasised the difficulty which would be experienced in keeping the rabbit pest under control whilst large areas of land remained unoccupied. Under such circumstances a landholder could use every effort to eradicate the rabbits from his property without avail. He urged that some alteration in the administration the Act should be made so that full use could be made of much land which would grow good grass, the benefit of which was now lost.

> KOPPIO (Average annual rainfall, 22.40in.). February 15th.—Present: six members.

EXPERIMENTAL PLOTS.—The following report was furnished on the experimental plots conducted by Mr. J. Newell. The plots were scarified once after rain on April 12th, 1915, and drilled and harrowed once after the drill. Each plot was sown with 2bush. of Calcutta Cape oats, and lewt., 2ewts., and 3ewts. of guano super. respectively; and were harvested on the 15th November, 1915. Results were as follows:—Plot No. 1, 1cwt. of super., yielded 120 sheaves, equal to 950lbs.; Plot No. 2, 2cwts. of super, yielded 96 sheaves, equal to 784lbs.; Plot No. 3, 3cwts. of super., yielded 100 sheaves, equal to 851lbs. Each plot was quarter of an acre in area, and this is the third year the plots have been cropped. The plots during growth were in appearance much the same, except that No. 3 (3ewts. super.) was a little thicker at the commencement of the season. Members in discussing the report thought that 1cwt. of super was the most profitable dressing for this district Mr. W. R. Richardson tabled samples of graded and ungraded wheat. The graded seed (Bunyip) was a very fine sample. Members all agreed that it paid handsomely to grade all seed for sowing.

MOUNT HOPE.

February 4th.—Present: six members. Care of Machinery.—Mr. A. E. J. Hillier contributed a paper on this subject. He said that the first essential was to have a shed in which all implements and machines could be put to protect them from the effects of the weather, which were probably more harmful than the actual wear and tear of usage. The shed should be built of galvanized iron as more likely to afford protection from fire. any machine was finished with for a season, all bearings should be thoroughly cleaned and overhauled, all loose nuts should be screwed up, and worn and broken Mr. P. Myers said that repairs to an implement should be effected before it was put away, as the needs were then fresh in the mind of the operator. Mr. Vigar preferred an open straw-roofed shed to an enclosed iron shed, as it gave all necessary protection, and was cooler than an iron building. Mr. Stegeman thought that the price of iron precluded its use for such a purpose. Mr. Speed advised members to insure their machinery against loss by fire.

ROBERTS AND VERRAN.

January 18th.—Present: seven members and one visitor.

CARE OF HARNESS.—In a paper on this subject the Chairman (Mr. D. Hoar) said that harness should be always hung up when not in use, and should be given at least two good oilings each year. Reins should be folded so that there were no twists in them, as if once allowed to become twisted, and if not oiled regularly it would be almost impossible to straighten them again, and a twist in a rein very soon became a break. Before oiling harness it should be cleaned of all dirt, and the oil then applied slowly with either rag or brush, so that it soaked well into the leather. The practice of dipping the harness into oil was not so effective. The addition of mutton fat to the oil was advisable for harness dressing in winter. A suitable shed or room should be provided for the accommodation of the harness to protect it from the effects of the weather. All harness should be occasionally

examined for defects, which should be remedied as soon as detected. Mr. W. Kunst drew attention to the necessity for ventilation of the harness room, as if damp harness were put away overnight in a close room, it would not be dry by the next morning. Mr. C. Kunst suggested washing the harness in warm water to clean it before applying oil. Mr. B. McCallum recommended as a harness dressing, neatsfoot oil, mutton fat, and resin in equal parts; the resin assisted in preventing the entrance of damp into the leather. Messrs. A. T. and F. Cowley, F. Masters, and W. Sharman spoke in support of the paper.

Mr. F. Masters supplied the following report on experimental plots, which he had conducted:—

Manurial dressing.	1914.	1915.
•	Bush. lbs.	Bush. lbs.
½cwt. super. guano	1 23	12 - 46
½cwt. superphosphate	2 19	12 48
lcwt. super. guano		15 43
1cwt. superphosphate		16 9
2cwt. each of super. guano and superphosphate	3 - 34	15 35
1½cwts. super. guano	3 50	15 39
1½cwts. superphosphate	4 23	15 28
3cwt. each of super. guano and superphosphate	4 4	15 24

The plots, each one acre in area, were sown with 1bush. of Golden Drop wheat, on June 3rd. The rainfall during the growing period was 9.47ins., while the total rainfall for 1915 was 16.98ins.

Mr. A. T. Cowley reported the results of tests which he had carried out with varying quantities of seed sown per acre:—

No.	Variety.			d per	Manured with Super- phosphate.	Date Sown.	
1 2 3	Federation	Lbs. 534 41 245	Bus. 9 9 9	lbs. 17 27 12	Per Acre. 95 lbs.	June 22, 1915	
4 5 6	Golden Drop	24 38 53	12 13 15	1 43 2	95 lbs.	June 23, 1915	
7 8 9	Yandilla King and Marshall's No. 3 (mixed)	Approx. ½ bush.	8 8 8	22 23 0	60 lbs.	April 28, 1915	

Remarks.—Plots 1 to 6, sown on fallow ground, were troubled with growth of silver and barley grasses, which appeared to gain the greatest advantage over the thinly-sown plots. Plots 7 to 9, sown on stubble ground (after light burning) were damaged by "takeall" early in the season. All appeared to be equally affected. Plots each one acre in extent. Rainfall during growing season, 9.47ins.; for the year, 16.98ins.

YANINEE.

January 22nd.—Present: 11 members.

Care of Harness.—In a paper on this subject, Mr. J. J. McCarthy recommended the overhaul of farm harness at least twice each year, preferably before seeding and harvest operations, when all defective parts should be repaired or replaced. The harness should be thoroughly washed with warm water and softscap, and a mixture of neatsfoot oil and mutton fat should be applied to it. Collars required special attention; they should be heavy, with plenty of straw, and should be kept well lined, preferably with leather; if this were given proper attention chafing of the horses' shoulders should be avoided. Care should be taken that hames were properly fitted to the collars, and chains and traces should have attention occasionally. Every farmer should have a harness room, situated at the entrance of the horse yard;

It should be fitted with a rail on which to place collars, and pegs should be provided for other harness. Mr. Dunn suggested overhauling harness after harvest and seed times, as before those periods it was often difficult to have repairs effected Other members discussed the paper, and the writer answered several promptly. qustions.

YEELANNA.

January 22nd,—Present: 13 members and two visitors. FIRE RAKING.—Mr. G. W. Proctor contributed a paper on this subject. that no farmer in new mallee country should be without a fire rake. If this implement had been in general use when the new hundreds were opened up, there would have been far less trouble with shoots at the present time. He strongly advised all new settlers to make use of the fire rake on every available hot day, and they would find the following crop more satisfactory than it otherwise would have been. The fire rake should be about 18ft. long; two horses could work this in stubble, but if working bush on fallow, three horses would be required. He had found it do better work when a long bar of iron or piping was placed across the top of the tines to act as a weight. A greater quantity of material was then kept in the rake, and a better flame was provided for the destruction of the shoots. Raking should be done across the direction in which the wind was blowing, as good work could then be done in both up and down journeys. Raking against the wind made a good job, but in returning with the wind the operation was not found satisfactory. If the straw was thick enough for a fire to run, it should be broken down before raking; if thin it was better to allow it to stand. Where the straw was thin, it was a good plan to spend a little time in cutting some of the larger shoots. A good, steady pair of horses was necessary to successfully operate the fire rake, and they should not be driven too fast. The paper was discussed by members, who were agreed that the fire rake was a very necessary implement to farmers in mallee districts.

YADNARIE, January 15th.—The Importance of Agriculture.—Mr. W. L. Brown read a paper on this subject. He emphasized the importance of the agricultural industry to the State, and said that those engaged in farming pursuits required to work long hours ungrudgingly if they desired to succeed. Every farmer, he said, should be a member of the Agricultural Bureau, so that he would come into contact with the experts in all branches of his calling. A great improvement in farming practice and methods should then be evidenced.

EASTERN DISTRICT. EAST OF MOUNT LOFTY RANGES

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

October 28th.—Present: seven members and one visitor.

HARVESTING MACHINERY.—Mr. G. Gray read the following paper on this topic:—

"No part of the wheat farmer's work is so important as that of gathering the Quality of work and expedition are the essential features of this operagrain. To save all the crop, and to do it quickly, is worthy of more than a little It is very evident that the class of machinery used has much influence in expediting this important work. The first implement used in connection with the harvest is the binder. As this machine has been brought almost to perfection little need be said regarding it, excepting, perhaps, the width of cut which should be not less than 6ft.; 7ft. is a nice cut on clear ground, and such a binder will handle a three-ton to four-ton crop with ease. But where there is the danger of trouble with snags the strain on the machine for anything over a 6ft. cut will be too great. The use of a double set of finger guards might overcome to some extent the trouble of small roots getting into the knives. All that is required to do this are the extra guards, a 'Borritt' brace and bit, a hack saw, and a handy man to do the Following the binder the next implement is the stripper, complete harvester, or the reaper thresher. The width of cut is probably the most important point in connection with these implements. It should not be less than 6ft. The side draught of these implements is perhaps the question at issue in regard to the width of cut,

The harvester and reaper thresher overcome this difficulty somewhat by the fact that the grain is all loaded on the near side of the main wheel, thus bringing the load more directly behind the horses. The difficulty can be overcome in a lesser degree in the ordinary stripper, by fixing flanges about lin. deep on the offside of the roof, just over the delivery board. There should be three of these about 10in. apart, and should have a slight curve towards the near side of the machine. These flanges intercept the grain as it comes up along the roof, and divert the bulk of it to the near side of the box, thus keeping the load off the grain wheel and placing it on the main wheel. This is not so easily done in the case of damp The second thresher intercepts the sweep of the weather threshing machines. grain, and consequently it cannot be so easily diverted. A long platform ensures straighter running, and this, with high wheels, gives lightness of draught in either stripper or harvester. Another matter that is overlooked by many good makers of both strippers and harvesters is the driving of the thresher. This should not be driven by the belt that drives the beaters. There should be a double fly wheel, and direct belts should be used. This ensures a good grip on the pulleys, and the belts do not require to be kept so tight, which, of course, lessens tear and wear as well as draught. No 'dead' pulleys should be used, except as belt tighteners. Every stripper or harvester should have an adjustable comb, one that is easy to manipulate and strong and rigid; it should be made of steel to lessen wear. Every tooth should be of the 'saveall' type, and have a thin edge to avoid choking. The gullet should be a little wider towards the point of the tooth than at the beaters. All machines over 5ft. in width should have an intermediate bearing. This will ensure smooth running. Where there is chatter of the beaters there is vibration of the comb, and consequently loss of grain. The upkeep of strippers is very much This is due largely to the one-part bearing that heavier now than 20 years ago. is now used. The two-part cast iron bearings that were put into strippers 35 years ago were everlasting compared with those now generally used, the reason being that they were made very hard, and when they became slightly worn they could be closed, thus saving oil, and preventing chatter and extra wear. The bridle of either stripper or harvester should be arranged so that part of it comes direct from the body of the machine. This tends to keep it from sagging, and also takes considerable strain off the rack. Where strippers are used the next important machine The drawback of the hand winnower is that it is too slow and is the winnower. in treating tough varieties of wheat the waste and trouble with heads is very great. A very useful machine is the horsepower winnower. But the upkeep of this machine is heavy, and where ordinary strippers are used it is hardly equal to the threshing that is required. As on most farms engine power is used for cutting chaff, the power winnower is worth considering. There is a great advantage in having the stuff threshed before it passes into the winnower. It minimises the loss of grain in the chaff. The difficulty experienced in the mallee districts with the power winnower is with the thresher. Small sticks and roots are picked up from the floor, and give a lot of trouble in passing the thresher. What is required is a thresher so constructed that it will be sufficiently rigid to stand the strain of ordinary threshing, but which will give way when it meets an obstacle that cannot pass through it. Machines with such threshers, I believe, are on the market. There is no doubt that the cheapest way to handle a crop with strippers is to have 6ft. to 8ft. machines, and where there are, say, three of these at work, to have the cleaning done direct from the strippers with a power winnower. The labor required to put the crop into heaps will go a long way towards preparing it for In this case a machine is required that can be easily transported. water that is required to run the engine is a great hindrance. Consequently it would be an advantage to have an air-cooled engine. On the power winnower the chaff elevator and back part of the machine should be enclosed, so that a change of wind did not affect the operations very much. The recent drought and the high price of mutton and beef has no doubt made farmers turn their attention to the question of handling the major portion of their wheat crops with the binder and header or thresher. Any crop that does not average 12bush. per acre cannot be successfully handled in that way. The header is a cheap and handy machine, and a good deal of fodder can be accumulated by its use. On account of the 'takeall' scourge in this district, there is no doubt a very much larger area will have to be sown with oats, and I believe the best way to harvest an oat crop is with the binder and header. A header and winnower combined is now coming on the market, and probably it will pay a number of farmers to co-operate and obtain one

of these machines for the purpose of handling some of the crop in this way. oat crop is much more easily handled with a binder than is a wheat crop, especially if the wheat crop is not well grown, and all oats that can be cut with the binder should be handled in that way; the grain that is required should be threshed out with a header."

HALIDON.
January 22nd.—Present: 14 members and two visitors.

THE HARVEST .- It was reported that the average wheat yield for the district was about 9bush. per acre. The highest average one farm recorded at the meeting was 15bush., and the lowest 4bush. to 5bush. One member recorded an average for 10 acres of 21bush. Members agreed that old land had yielded better than new, almost in every case, generally to the extent of 3bush. to 4bush, even though it received exactly the same treatment. The reason for this was not apparent, though some members thought the extra superphosphate from the previous year on old land had exerted a beneficial influence, but most members had foreseen this, and dressed new land more heavily than the old. Another reason suggested was that the new land was still sour, whilst the old had had an opportunity of becoming sweetened; but nembers with previous experience in the mallee stated that in other years new land had frequently grown better crops than old. Mr. Russell had put 75lbs. per acre of super, on new land and 56lbs, on old, but the new did not yield nearly as well as the old land. He found that early wheats did better than late on new land, but yielded about the same on old. "Bobs" yielded the highest return on the new land, and "Gluyas" the highest on the old, though "Yandilla King" also yielded The chairman (Mr. M. O. Weste) had sown some Yandilla King immediately before and immediately after the first rain. It was all pickled, but that sown before the rain was quite free from smut whilst that sown after was slightly Mr. Russell said that the smut spores on the wheat sown previously to whilst in the other case they had germinated simultaneously, and the smut had found a host in the young wheat plant. Mr. Bird had also observed the same occurrence, and said that self-sown wheat was rarely affected by smut. A short discussion then took place on the best practices to follow in future, judging by the experiences of the past season. Mr. Russell recommended sowing 45lbs. per acre of late wheats and 55lbs. of early wheats.

MANTUNG.

January 20th.—Present: nine members.
Scrub and Stubble Burning.—Mr. G. N. Baker contributed the following paper:--'In dealing with this subject I propose to treat it under two headings, namely (1) scrub burning; and (2) grass and stubble burning; for, although both are carried out under the same conditions, the mode of procedure may be slightly different to obtain the best results. A grass or stubble fire is soon over, but a scrub fire requires favorable conditions to ensure a minimum of labor afterwards. Scrub Burning.—Taking it for granted that the scrub has been cut and allowed to lie long enough to burn, a good break three sides—east, south, and west—about half a chain wide, should first be cleared. This should be done in the spring, before the leaves fall, so that everything is in readiness for lighting on the day chosen. As soon as the burning season opens, choose the first good north wind, and wait until somewhere about midday to ensure that the wind is set in the right quarter, and also to allow of the drying of any dew that may have formed over Co-operate with your neighbors in burning, as the lighting is done more quickly, and there is less risk of the fire getting beyond control. First light on the southern side, and burn against the wind for half a chain. When sufficient is burnt light from the south-eastern and south-western corners, and work north; then . along the northern edge. Providing a good wind is blowing a good burn should result, as all flames rush towards the centre, owing to the draught caused by the heat. After the fire has been over the land, commence the stick-picking as soon as possible, say the next day, as a good deal of labor is saved if the sticks are picked while the logs are still burning. They only require to be kicked together a little in the majority of places. Grass and Stubble Fires.—Less precaution is necessary with the grass and stubble fires, as they are not so fierce or likely to get beyond control. Lighting may be carried out as with the scrub fire, but less work is necessary with the break. Sufficient break is made with the plough, say, four widths of a six-furrow implement round the paddock. The ploughed break can be harrowed, also a little distance in from the break as well as that area burnt first, if it be thought necessary, but the four widths of the plough should be sufficient. A harrow is well filled with straw and set alight; a good flame will result, and dragged slowly along by the horse, this will give the paddock a good light.' Mr. J. P. Tonkin preferred burning in strips of not more than 20 chains. Mr. Lehmann considered a break of up to a chain width necessary. Mr. Hannaford preferred the "burned' to the "cleared" break. Mr. L. J. Pearce would burn in one piece, provided the scrub was evenly distributed. Mr. W. Stewart thought a good steady wind better than a gale, as the stumps were burned better. Mr. Baker, in reply to Mr. Tonkin said that, for an area of say 500 acres, he would burn in two parts, but would burn the whole of a smaller area in one operation.

Experimental Plots.—The following report was supplied, relating to experimental work carried out under the auspices of the Branch:—Manurial Test.—Plots sown with 50lbs. Yandilla King per acre, drilled May 6th, nature of soil, sandy; uniform over all plots, which were each one acre in extent. No. 1.—No manure, yielded 4bush. 25lbs.; No. 2, 56lbs. super., yielded 5bush. 41lbs.; No. 3, 84lbs. super., yielded 6bush. 46lbs.; No. 4, 112lbs. super., yielded 7bush. 4lbs. Comments.—All plots made slow growth, and on appearance there was no choice between them. The land was not sown last year. Super. was 36-38 per cent. Varieties Tist.—Five plots, each sown with 50lbs. seed, 50lbs. 36-38 per cent. superphosphate; drilled May 8th to 10th; nature of soil, grey loam, stony; uniform for all plots. No. 1, Red Russian, yielded 11bush. 19lbs.; No. 2, Golden Drop, yielded 6bush. 47lbs.; No. 3, Sydney Purple, yielded 8bush. 32lbs.; No. 4, Federation, yielded 8bush. 3lbs.; No. 5, Yandilla King, yielded 12bush. 8lbs. Comments.—Plots were sown too thickly, but made good growth, except Yandilla King, which was short. This had also several bad patches of mustard, and suffered from the effects of the wind in places. All plots were free from disease, except Golden Drop, which had a little "bunt." The land was sown last year, but did not carry any erop. The yield of Yandilla King is creditable, in that it was almost choked with mustard in a few patches, and the wind cut it in others. The plots were one acre in extent.

ROSY PINE.

February 16th.—Present: eight members.

EXPERIMENTAL WORK.—Messrs. Hay, Lee, and Camens were appointed a committee to make arrangements for conducting a series of experimental plots during

the coming season.

TAKEALL.—In a paper on this subject, Mr. E. E. Schiller said that nearly every farm in the district had suffered from the effects of the takeall fungus during the past season. Out crops were very rarely affected by takeall, so to combat the disease, he advocated a rotation of wheat, outs, and fallow; working of the land when it was dry or half-dry should be avoided. There was, however, but a lämited market for oats, and the price was generally low, and the cost of bags almost pro-hibited storing them in that way. There was, however, a possibility of making use of oats to feed sheep. The price that had prevailed for meat would make the hand feeding of sheep payable, and with that idea farmers should cut as much of the oats as possible with the binder and stack, as that was a cheap way of storing. The balance that could not be cut with the binder should be stripped, cleaned, and stored in bulk in a properly constructed barn. Such a barn should have the floor raised well above the ground level, with ample ventilation underneath to keep the grain from becoming moist and thereby spoilt. By keeping sheep and working the land when in proper condition and following the suggested rotation of cropping, there should be little trouble with takeall. As it would not always be necessary to hand feed the sheep there would be the additional advantage of having a good stack of, fodder on hand, so that when a dry season occurred, not only could the farmer's own stock be saved, but he would be in a position to buy in sheep on a low market, and fatten for the butcher to realise good prices. In the past insufficient attention had been given to conservation of fodder, as the experiences of the drought had shown. Mr. Lee supported Mr. Schiller's proposal, but thought that mice would eat the oats if stacked. Mr. R. E. Schiller said if sulphur was used in the first few layers of a stack it would prevent any difficulty with mice.

WYNARKA.

February 12th.—Present: 14 members and one visitor.

Members reported the harvest returns, which were of a very satisfactory nature, ranging up to 18bush, per acre, with bulk averages up to 14bush, per acre. It was the rule for old land to return better results than new, and as good returns were secured on land that was not cultivated as from land that had been ploughed. Mr. C. W. Schultz reported the result of experimental plots: Four plots were sown with 45lbs. of seed to the acre, and varying manurial dressings. The no-manure plot yielded 18bush. 39lbs.; 50lbs. super., 23bush. 6lbs.; 75lbs. super., 24bush. 25lbs.; 100lbs. super., 23bush. 36lbs.; and 100lbs. super., the crop being fed off, 22bush. 20lbs. Two plots were sown with 55lbs. seed, and 75lbs. super per acre; one was harrowed when 6in. high, and yielded 23bush. 6lbs., whereas the other not so treated, yielded 23bush. 14lbs. In each case the plots were $1\frac{1}{2}$ acres in area. Mr. J. R. Beck reported that 12 acres of unpickled wheat returned seven bags more than the same area of pickled seed, but the sample was not so clean in the former case.

LAMEROO, October 30th.—Homestead Meeting.—The meeting was held at the residence of Mr. A. J. A. Koch, and an inspection was made of the experimental plots conducted by him. Members expressed their pleasure with what they saw, and a profitable time was spent. The necessity for growing oats to reduce the frequency of the occurrence of ''takeall'' was impressed upon members.

LAMEROO, February 19th.—Experimental Work—Mr. A. J. A. Koch submitted a report on experimental plots conducted by him as follows:-Plot 1, untreated seed, 55lbs. mineral super. per acre, yielded 10bush. 55lbs.; Plot 2, untreated seed, 50lbs. guano super., yielded 10bush. 45lbs.; Plot 3, untreated seed, no manure, yielded 8bush. 29lbs.; Plot 4, treated with "Beatsall," 90lbs. guano super., yielded 13bush. 22lbs.; Plot 5, treated with "Beatsall," 7bush. 28lbs.; 40lbs. to 43lbs. seed sown per acre. As a result of his work Mr. Koch concluded that the use of "Beatsall" was not a payable proposition, and other members reported the same experience.

MONARTO SOUTH, January 22nd.—The evening was devoted to ascertaining the average weight per bushel of wheat harvested in the district. The average weight of the samples brought in by members was computed to be 65lbs. 2ozs. per bushel.

SANDALWOOD, February 19th.-Members reported on the results obtained from the different varieties of wheat grown by them during the past season, and it was agreed that Federation, Dart's Imperial, Marshall's No. 3, and Gluyas had given the best returns. As a result of the experience gained by members, the following varieties were recommended for the district:-Federation, Walker's Wonder, Yandilla King, Dart's Imperial, Golden Drop, Gluyas, Marshall's No. 3.

SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

February 15th.—Present: eight members and one visitor.
WATTLE BARK.—Mr. Hal. Jacobs contributed a paper on this subject, dealing with the stripping and preparation of bark for market. The first essential, he said, was to have good tools, and a good "horse" or block on which to prepare the wattle for stripping. When sufficient wattle for, say, one bundle of bark had been cut and trimmed it should be conveyed to the block a little distance in front of which had been driven a peg, by which to regulate the length of the bundle. When the wattle was cut up to the desired length, the pieces should be moved over the "horse" using the tomahawk to loosen the bark so that it could be pulled off the sticks with little trouble. The pieces of bark should be laid down carefully, the full length pieces by themselves with the butt ends of the bark alternately at opposite ends of the bundle; the smaller pieces, however, should be laid down with the butts all in one direction. To make up the bundles, the long bark should be laid flat on the ground, and the short pieces placed one portion at one end and an equal portion at the other end of the bundle, which could then be easily and tidily tied up. A pair of strong straps were very useful to aid in tieing up the bundles;

the straps should be laid down, and the bundle of bark rolled over on to them, so that the ends could be secured and the bundle fastened tightly with the straps. The bundle could then be tied with string and the straps removed, the bundles removed to a central position, where they could be conveniently secured with a conveyance; they should not, however, be placed one on top of another. Should rain fall on the bundles they should be carefully dried in order to avoid damage. He did not favor the practice of covering the bark over with wattle tops. cussion followed.

CLARENDON (Average annual rainfall, 33.67in.).

November 16th.—Present: 11 members and one visitor.

Inspection Tour.—Members met at 'Thorngate,' Mr. F. Shiedow's farm, and spected various crops. The trip was continued through Mr. Brook's farm to inspected various crops. Mr. A. A. Harper's, where some fine crops of hay were inspected; also a recently installed irrigation plant with an ideal sprinkler at work, drawing water from the Onkaparinga River and distributing same in beautiful sprays over 1-16 of an acre of cabbages and caulflowers.

CYGNET RIVER.

February 17th.—Present: eight members and two visitors.

FARM MANAGEMENT.-Mr. F. J. Wakelin contributed a paper on this subject. He said that his experience with foals had shown that it was best to treat them very kindly, so that when the time arrived for breaking them in to work they were easily handled. A colt should be broken in to light work when about two and a half years of age, and during the subsequent year should be handled very carefully, as that period influenced the character of the horse a great deal, either for good The medium draught horse was to be preferred to the heavy draught for farm work. It was an excellent practice to put an extra horse in the team, as the horses did not become so weary, and more ground could be covered in a day. It was not absolutely necessary to house such implements as ploughs, cultivators, and harrows when not in use, but they should receive a coat of paint occasionally. Other machinery, however, in which the construction was partly of wood, should have shed accommodation, and they should be overhauled as soon as the season's work was finished. The wide stripper was to be preferred to the harvester. With two of the former implements large areas could be dealt with, and the saving of the chaff was of some value, in view of the experiences of the recent drought. It was an advantage for the farmer to have a few carpenter's and blacksmith's tools on the farm, as he could frequently execute minor repairs which were expensive if carried out by a tradesman.

HARTLEY (Average annual rainfall, 15in. to 16in.).

February 16th.—Present: 16 members.

THE HARVEST.—Members reported that harvest results were very satisfactory, yields being higher than was anticipated. The wheat yield for the district ranged from three to five bags per acre, some crops yielding as much as eight bags to the Federation gave good returns, and Rustproof, Baroota Wonder, Marshall's, Golden Drop, Yandilla King, Lotts, Budd's Early, and White Tuscan also yielded to advantage. The yields from barley ranged from five bags to 12 bags, while the hay yield averaged one ton to two tons to the acre. Most of the wheat was a good sample. Mr. S. Beavis, who had recently made a tour through New South Wales, referred to the excellent crops which he had seen there.

> KANMANTOO (Average annual rainfall, 17.90in.). January 15th.—Present: six members and one visitor.

BLACKSMITHING ON THE FARM.—Mr. W. C. Mills contributed a paper on this sub-He said that all farmers, especially those who lived in scattered districts, should learn blacksmithing so that they could carry out simple repairs to implements or machinery without the assistance of tradesmen. A farmer with a little experience could effect repairs which, if taken to a tradesman, would prove expensive in time and money. He could also keep his ploughshares sharp and in good order, with the result that his land would be cultivated in much better fashion than if his ploughing were done with blunt or bent shares. He recommended establishing a proper workshop in preference to purchasing a portable forge.

was convenient in some cases, but if any number of tools and appliances were acquired it was better to erect a suitable workshop. This should have masonry walls and an iron roof, and the latter should be sufficiently high to allow of convenient The forge should be situated opposite the doorway, so work inside the building. that any long piece of work could be allowed to project through the doorway. there was a wood-working bench in the shop it should be placed as far away from the forge as possible, or, better still, partitioned off from the shop, otherwise there would be considerable danger of fire with the wood shavings lying about. old-fashioned bellows were provided, it would be necessary to erect a stand for the fire; for this purpose an old tank cut to the correct height and filled with clay would serve very well. When setting the bellows, they should be arranged so that the draught was projected upwards through the fire; if this was not done difficulty would be experienced in securing a fire of sufficiently high temperature. anvil would be found effective for all purposes. A light hammer, a heavy hammer, vice, and a set of taps and dies should be provided, also pipe wrench and four pairs of tongs-one for flat, and two for round iron, and one for holding horseshoes. The taps and dies should never be used for threading hot iron, as it caused the loss of the temper of the steel. A piece of three-cornered file, untempered, would be found very useful for cutting iron into lengths. The tempering was a very important process in the manufacture of a chisel or punch. When a chisel was shaped ready for tempering, the part to be tempered should be heated until of a bright red color, taking care that the body of the chisel was also heated sufficiently. point of the chisel should then be immersed in clean cold water; when removed the portion to be tempered should change color first from a light straw color to intermediate colors and then to dark blue. The tool should then be returned to the water and allowed to cool right off, and when the color became purple, it was tem-The process of tempering required pracpered sufficiently to cut ordinary iron. tice, and it was necessary to persevere in order to attain satisfactory results. When heating iron the fire should be well built up, and there should be 3in. or 4in. of fire between the iron and the entrance place of the draught. For working, the iron should neither be too hot nor too cold; in the former case it burned away, and in the latter it would split if hammered. Ordinary iron could be worked into a fairly large bend when between a red and a yellow heat; if necessary to bend the iron at right angles it should be between yellow and white heat. Iron should also be at white heat when being drawn out. No time should be lost in conveying the iron from the fire to the anvil. In welding, the portion to be welded should be made somewhat thicker than the other part, as in the process of making the weld, some of the iron would be lost. A drilling machine with the necessary drills was an important adjunct. In purchasing the drills, it should be remembered that holes required to be bored 1-32in. larger in diameter than that of the iron to be passed through them. A supply of bolts and rivets should be kept on hand-in., in., in., and §in. sizes should be sufficient for ordinary requirements. An old scythe blade, indented with the edge of a file, would be found very useful for the removal of the ends of bolts of excessive length. When bolts were used on any work, they should have a coat of linseed oil or old paint, which would preserve them, and at the same time permit of their speedy removal if necessary. When a break occurred in any machinery or implements, it should not only be repaired, but an endeavor should be made to detect the cause of the break, and to have a correction made which would prevent a repetition.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

January 18th.—Present: six members.

Care of Harness and Implements.—Mr. A. Stirling contributed a paper on this topic. He said that, wherever possible, a separate room or shed should be provided for the accommodation of harness, and it should be fitted with pegs, about 1½in. in diameter and of sufficient length to hold collars as well as other harness securely. All harness should be overhauled at least twice a year, given a good cleaning, and oiled with a mixture of neatsfoot oil and mutton fat. It was a good plan to keep a few tools with which minor repairs could be executed. It was important that all traces should be of equal length, as carelessness in this respect was often the cause of sore shoulders. All nuts on implements should be kept tightly screwed up, and a small assortment of bolts, nuts, and washers should always be kept on hand. Woodwork should be painted at least once a year with two coats of paint; the

first coat should be mixed with raw linseed oil and turpentine, and after its application all cracks should be stopped with putty; the second coat of paint should be mixed with oil, two parts of raw, and one part of boiled oil. When cleaning the seed and fertiliser drill, it was a good practice, after cleaning the stars and plates in the manure feed to brush them over with black lead. When the stripper was put away for the season a prop should be placed under the off-side front corner, in order to keep the comb level and prevent it sagging. For ploughs and other iron implements the application of coal tar was a good substitute for a coat of paint. The operation should be conducted on a warm day, and the tar should be boiled before application. The final and most important rule to observe was the protection of all implements from the weather, and that should never be neglected. Discussion followed, and Mr. Stirling answered a number of questions put by members.

MILANG.

January 7th.—Present: 27 members.

Care of Horse's Foot.—In a paper on this subject Mr. T. Higginson emphasised the importance of the horse's foot, as when that member was injured the horse was almost, if not quite, useless. The frog was a most important part of the foot, as it acted as a cushion to absorb the jar caused when the foot struck the ground. The frog should never be pared down, although it might at times be necessary to remove loose pieces from it. When a horse was turned into a paddock for a spell its shoes should be removed, otherwise the hoof would grow over the shoe. The edge of the hoof should be kept rounded off, in order to prevent chipping or breaking away. When a horse was shod, the hoof should not be rasped away for more than an inch above the shoe. If there were wrinkles or ridges in the hoof they should not be rasped, as that practice resulted in a thinning of the hoof, which was undesirable. He recommended glycerine as a beneficial application to sand cracks.

SHOEING.—Dealing with this subject in a paper, Mr. A. Ross referred to the cruelty to which horses were subjected in the process of shoeing. In dealing with a young animal, not used to being shod, it was advisable to handle the animal quietly, he said: harsh treatment, unskilled handling, and undue restraint should be obviated. Trimming the hoofs, and paring the lower surface thereof, especially when carried to the extent of paring the sole until it sprung to the pressure of the thumb, were unreasonable and barbarous. Whilst it was necessary to remove excessive growth of the walls, to denude the sole of its horn was cruelty. He then described the growth and function of the horn.

NARRUNG (Average annual rainfall, 17in. to 18in.).

February 12th.—Present: eight members.

EARLY GREEN FODDER.—Mr. F. Eatts contributed a paper on this subject. He said that lucerne was one of the best fodders for stock if managed properly. If it was desired to maintain a good flow of milk from cows, several paddocks of green feed should be provided for them. Oats were to be recommended for the district; they should be sown in February or March; Ibush, to the acre on stubble land would provide a good quantity of feed. Oats withstood the heat better than barley or rye, and stooled better than the latter two fodders when fed off. An area of say 10 acres could well be sown to barley and the crop cut with the binder and made into ensilage. He had found that lucerne supplemented by such fodders gave very satisfactory results, and would not recommend rape or mustard for their district.

MENINGIE, February 12th.—Sheep Breeding.—In initiating a discussion on sheep breeding in this district, Mr. T. W. R. Hiscock expressed the opinion that the Merino was the most suitable. For export the Merino should be crossed with the Shropshire or Lincoln.

MYPONGA, January 29th.—Bot Fly.—A discussion on methods of dealing with this pest took place. Members recommended the daily application of kerosine to the under portion of the horse's chin, in order to discourage the flies from laying their eggs there.

SOUTH-EAST DISTRICT'

NARACOORTE (Average annual rainfall, 22.60in.).

February 12th.—Present: 28 members.

WHEAT, BARLEY, AND OATS .- The Chairman (Mr. S. H. Schinckel) contributed the following paper, dealing with the best varieties of wheat, barley, and oats, and the best methods to adopt to grow them successfully:-"For the benefit of our country, as well as ourselves, I think it is the duty of every landholder with suitable land to grow as much wheat as possible, and to do that successfully it is well that we should know the best varieties and methods of growing. For an early wheat I prefer Steinwedel. It grows a good bulky crop, yields fairly well, makes fair hay, but shakes very badly. Therefore I would not advise growing a great quan-Gluyas, King's Early, and Golden Drop are also early wheats, but these I have not found suitable to our district. For a medium early and general wheat I certainly prefer Federation, and generally it certainly gives satisfactory returns. For late wheat I prefer Marshall's No. 3 and Yandilla King. They are both fairly rust resistant, and make very good hay, but are somewhat hard to thresh. the selection of wheats every farmer must be guided by the soil of his own farm. Soils differ, seasons differ, and so do wheats. For instance, Federation will generally give better returns on rising chocolate or loamy soils than any wheat I know, while I have known Marshall's No. 3, Silver King, Gallant, Dart's Imperial, and Yandilla King to give better returns on our low-lying black lands than Federation. Some seasons are more favorable to one variety than another. Severe frost in the spring, or hot winds may ruin one variety, while another variety in the same paddock may escape both frost and hot winds. For oats for this district I certainly recommend Algerian; they are reliable, and give good returns for grain and hay. Cape oats make better hay than Algerian, but are not so reliable; they also go down badly, and are very subject to red rust and smut. Generally speaking Cape barley gives the best returns, but unfortunately it is not always an easy matter to find a market for any quantity, while on the other hand a good market can nearly always be found for a good sample of malting. For malting I prefer Duckbill and Cheva-To grow grain successfully it is absolutely necessary to prepare the ground thoroughly, and this is best done by fallow. We have a great variation of soils and methods, and times of operations also vary. On some of our light, loamy soils we may plough at any time during the winter, while with others that often become very boggy it is impossible to make much progress. These light, loamy soils do not require a great deal of after working, unless weeds are troublesome. Our heavy black soils and clay loams are very different, and costly to plough in the winter owing to their sticky nature. Therefore the fallowing must be done later according to season. There is no danger of this class of land being overworked by cultivating and harrowing, providing the land is not too wet. These heavy black soils should always be cultivated previous to sowing. No hard and fast rule can be laid down as to the depth of ploughing. In this we must be guided by our soils. of farms in this district are only small ones, and under such circumstances it is not possible to do much in the way of fallow, and it naturally follows that the same land has to be under cultivation two or three years in succession. Under such circumstances crop rotation will be found useful, and peas will probably give When land has to grow a cereal crop two or three years in succession I have found it advisable to plough as early as time and condition will permit, and harrow the land with the first rains, so as to encourage germination of weeds, then Sow wheat in May and June, using about one bushel use the cultivator freely. Sow oats early in May if for hay; June is not too late if for Use 1½bush, to 2bush, of seed per acre. Barley for grain should not be sown early, if a good crop of grain is expected; it must be grown quickly. For wheat, oats, and Cape use 12bush. of seed per acre, and for malting 1bush. barley use high-grade super., and up to lewt, per acre if you can afford it, and pickle the seed thoroughly." Mr. Loller said that many of the farmers grew wheats which had proved good, and then took to others for the sake of novelty. No doubt there were some good wheats coming prominently before them from crosses by experts, but he did not think they should cast aside the old wheats which had proved As to soils, there were many classes in their district. He had quite half a dozen on his farm, and they all required a different treatment to get the best out of them. There were the red and dark soils. They needed a lot of working, and it was necessary to be very careful in dealing with the light soils.

In reply to Mr. Rogers, Mr. Schinckel said it depended much upon circumstances whether land should be ploughed in a dry condition. Some lands they were compelled to plough in a dry state, because they could not work them in a wet con-They had also to be guided by the season. Mr. Bray had tried Calcutta oats, and found them do better than Algerian. They grew higher, were not so bitter, and the stock liked the hay from them better. Mr. Alcock (Superintendent of Experimental Plots in the South-East) said that Queen Fan and King Fan were early varieties, and somewhat similar to Federation variety. There had been some experiments this season with Gluyas wheat at Penola, and he had just seen the harvesting of it completed. It had been sown with 2cmt. of super., and it had returned 27 bush. per acre. Experiments had been carried out at Kybybolite with White Tuscan and Essex, two very good wheats. Some farmers in the South-East thought that they were the same, but that was not the case. Yandilla King and Marshall's No. 3 were good wheats. He agreed with some of the other speakers that there was a tendency on the part of farmers to go in for something He believed they would do better to stick to varieties that had been proved new. suitable to the conditions of a district. So far as experimenting was concerned they could put more work into the old varieties by selection, and try new ones along-To prove the merits of the varieties side the old ones under the same conditions. obtained by selection they had to sow them for five or six years, The Algerian oats yielded fairly well, but in his opinion there were other varieties that should be given a trial, e.g., Calcutta oats. They had done well at Roseworthy. At Kybybolite they were experimenting with a number of varieties, but they had not sufficient experience with them to recommend any particular one as the most suitable for the Of course the conditions varied very much in the same districts, but every district had general conditions common to it. He thought they should test the white oats. They gave bigger yields. In New Zealand 80bush, to the acre was an ordinary yield. The Scotch Grey was a good oat; though of short straw it yielded well in the heads. In Algerian varieties there were Tartar and Sunrise. leys they had the Cape, with which they were experimenting to secure a good selection. They were hoping to establish a good, plump variety for malting. There were some good malting varieties, such as Duckbill and Chevalier. He agreed as to the necessity for good cultivation to raise good grain crops, and this was especially necessary for barleys. Mr. W. Gould inquired if they could raise a new variety of wheat by selecting good heads in a crop. Mr. Alcock said they had to keep to a certain type of wheat to improve it by selection. New varieties were raised by crosses which had for their object some definite result. The same conditions obtained with grains and throughout plant life as with animals. In improving the breed of animals they kept to a type, and so it was with plants. As to raising rust-resisting wheats, he said, they could select plants with no rust upon them, and though they might not prove subsequently totally rust-resisting they might be less susceptible than other varieties.

EXHIBITS.—Mr. Geo. Turnbull showed a fine sample of Federation wheat in the ear. It was raised from shrivelled grain grown in the droughty year. Mr. Loller said they might have the luck to raise a good sample from shrivelled grain, but it would not do for farmers to take it as a precedent to follow. All experiences had proved that the best results came from using good wheat. Mr. Turnbull also showed a curiosity in fruit-growing in the form of a remarkable cluster of plums taken from a tree in his garden. Some members thought it was the variety known as the Early Orleans. The cluster weighed 5lbs., and there appeared to be about 60 well-grown plums. Mr. A. Johnstone said such a cluster on a fruit tree was unusual. Plums showed an inclination this year to cluster heavily on portions of branches. Mr. W. G. Haynes inquired for the most effective treatment for oidium on grape vines. Mr. A. Johnstone advised the use of sulphur.

CURCULIO BEETLE.—Mr. Feuerheerdt found the curculio beetle very plentiful in his garden this year attacking the fruit trees. It was very severe on the young trees. They were very difficult to destroy, and the only plan left to him was going round at night and placing a collecting sheet of paper under the trees. By shaking the trees they dropped into the sheet. A committee was appointed to make arrange-

ments for the conduct of a farm competition in the district.

LUCINDALE, February 15th.—Mr. P. Dow tendered his resignation as Hon. Secretary, having enlisted for service with the Expeditionary Forces.

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All communications to be addressed:

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, seab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

Imports and Exports of Plants, Fruits Etc.

During the month of February, 1916, 1,843bush, of fresh fruits, 3,232bush, of bananas, 8,546 bags of potatoes, and 51pkgs, of plants, seeds, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 202bush, of bananas (over ripe) were destroyed. Under the Federal Commerce Act 7,100 cases of fresh fruits were exported to oversea markets during the same period, viz., 7,100 cases apples to London. Under the Federal Quarantine Act, 2,208pkgs, of seeds, plants and bulbs,, etc., were examined and admitted from oversea markets. Of these 14lb, carrots and 1 bag beet were detained for cleaning, on account of the presence of proclaimed weed seeds.

Apples as Pig Feed.

"Apples will replace greenfeed to some extent, but I cannot recommend feeding same to small pigs (young weaners, 2½ to 3 months old), nor to the sows with young suckers," says the Dairy Expert, in reply to a question from the Watervale Branch of the Agricultural Bureau. "They could be fed to pigs over three months old at the rate of 3lbs. to 5lbs. daily, and to older pigs. It is preferable to boil them, and skim off the froth from the surface. Apples alone must not be considered as the basis of a ration, but must be fed with grain and other usual foods."

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

Yeelanna Agricultural Bureau reports a horse with apparently displaced kneecap. Reply—The horse's knee corresponds with the wrist, and has no cap. This is injury to the bones to which the tendons are attached. Blister with 1 dram biniodide of mercury to 7 drams of lard; half this quantity will be enough, the second half to be used three weeks later. Give a handful of bone meal in the feed for a fortnight.

"C. F. L. S.," Naracoorte, has an Ayrshire cow a little drowsy and lazy, otherwise not very sick, but has suddenly dropped in her milk. Ration includes sorghum.

Reply—The symptoms rather point to her being upset in her digestion by the sorghum, and it would be well to stop it in her case for a while and clear her bowels by a drench consisting of 1th. Epsom salts, loz. sulphur, loz. ground ginger given in a quart of beer; after that has worked off she should have 15 drops of tincture nux vomica morning and evening on tongue for a week or so. When sorghum is fed again it should be well wilted for 13 hours at least before feeding to prevent its cyanogenetic action.

"A. S.," Pinnaroo, has mare (nine-year draught) dull and lazy, and for two

months has persistently circled to the right; keeps up her condition.

Reply—If she had lost condition the trouble would probably have been an abscess in the stomach, but in the present circumstances it is quite probable that it arises from a tumor on the left side of the brain. It is impossible to be sure without an examination, but the following treatment might be successful:—Prepare the mare for physic by giving bran mashes only for two days, then let her have a six-dram aloes ball; when the effect of this has worked off she should have in her feed twice a day one dram of iodide of potassium for three weeks. As this drug is now very scarce and dear, this would probably cost a pound or 30 shillings. If treatment is undertaken a later report would be esteemed.

"F. G. R.," Wepowie, has a filly, two years, blind, strangles left swelling at back

of jaw, which interferes with breathing, roars in nose.

Reply—Have a dozen powders made up, each containing 2 grains of biniodide of mercury and 10 grains of sugar of milk, and place one on the tongue morning and evening. Obtain 40zs, of blue mercurial ointment and rub as much as will be absorbed into the swelling daily, at first bathe the swelling with hot water to facilitate the absorption. A later report will be esteemed.

"R. G. C.," Narrung, had a blood mare, six years, with a wire cut in front of

leg just below hock.

Reply—As the wound is healing a daily dressing with spirit of iodine, one dram resublinated iodine to one pint methylated spirit (one dram is roughly as much as will lie on a shilling) will probably complete the cure with as slight a blemish as possible.

"S. J. H.," Yarcowie, has a harness mare which is lame from hole in wall of

Reply—As she can walk sound, but is lame at trot, spell her and dress the hoof daily with Stockholm tar; the hole will gradually grow out downwards.

"J. B.," Penola, has a thoroughbred horse with large splints.

Reply—Cutting off splints is not advisable, because the irritation produced by the operation is likely to set up periostitis, which would result in larger splints. Try rubbing them five minutes a day with a smooth, round stick, and if this does not reduce them somewhat in three weeks, blister with an ointment consisting of biniodide of mercury 1 dram, lard 7 drams. In volcanic country such as the South-East there is a great tendency for blood stock to produce splints, which are very difficult to get rid of, and reappear a tremendous size if the bone is chiselled as suggested.

"W. F.," Keith, reports cows as being stiff, weak in hind quarters, and urine

dribbles; heavy in calf.

Reply—The symptoms are those which are frequently associated with the class of disease called dry bible. If the cows will not eat the bone meal, and yours is the right sort, mix it with the molasses and ginger that you are giving; they will eat it then, but from your letter they seem to have gone too far for it alone to do good. The molasses will not decrease their milk, but the disease probably will, and your prospects are far from good. The cow that loses flesh in spite of treatment and feed is very possibly tubercular, and it is advisable—see note in Journal of Agriculture—to communicate with the Chief Inspector of Stock, Adelaide, without delay, and he will send an inspector to see if such is the case. Obtain from the chemist 21bs. of syrup of phosphate of iron, and give each cow two tablespoons twice a day; the medicine is sweet, and they will eat it in bran or lick it off a stick. Continue the bone meal as well. A later report will oblige.

"W. L.," Balaklava, has a cow which was horned in vagina, irritated by flies;

refuses to heal, and growth extends round wound.

Reply—The original injury aggravated by the irritation has set up a form of cancer growth, and it will probably be best to feed the cow for the butcher. As regards treatment, it will be necessary to cut away the diseased tissue, and then to treat the new wound with an application of spirit of iodine daily. It is not stated whether she is in calf, but in any case the operation could be carried out with the aid of a local anæsthetic such as cocaine, without throwing the cow.

"J. F.," Monarto South, asks when will ewes take the ram after lambing,

especially if lamb is running with them?

Reply—No definite answer can be given, as it depends upon the individual ewe and her breed. Some ewes may come in season two, three, or four times; some, such as Dorsets, regularly produce two crops of lambs yearly. Speaking generally, if the lamb is old enough to wean, the introduction of the ram to the ewes in late summer or autumn will induce them to come in season.

"G. E.," Mildura, has a draught gelding, six years, troubled with pneumonia

and relapse on work, cough indicative of laryngeal trouble.

Reply—A light biniodide of mercury blister to the throat will be of service, probably mercury biniode will be of more use than arsenicum twice a day. A long rest will be advisable.

"J. F.," Salisbury, has a horse, loss of appetite, no pain, picks rubbish, swells

along belly and sheath and pines away.

Reply—The symptoms are those following some more acute attack such as inflammation of the lungs, and the chance of recovery is not too good. Place upon the tongue three times a day a powder consisting of four grains of iodide of arsenic ground up in 10 grains of sugar of milk. Continue for a fortnight if necessary. Feed principally upon bran and green feed with some crushed oats, and give a lump of salt to lick in order to form a counter attraction to rubbish. A further report will be esteemed.

"A. J. B.," Hill View, Alawoona, had a horse attacked with pain in belly after

eating smutty hay, getting cast, and injuring heel.

Reply—Smutty hay causes congestion of the liver, which in turn brings on pain, the casting was accidental, and not intended, but happened in rolling. It would be well to put the animal on bran only for two days, and then to give a five-dram physic ball; when the effect has worn off a teaspoonful of salammoniac twice daily

in the food for a week will do good. If the heel does not get better under present treatment dress it twice daily with a little spirit of iodine and smear vaseline on after.

"G. F. G.," Wirulla, has a gelding with growth on white of eye, inner corner. Reply—The growth is a form of cancer, due to irritation from flies. It is not quite clear whether it is actually on the white of the eye (Sclerotic) or on the third eyelid (Membrana nictitans). The latter is more common, though it occurs in the former as well. In either case it has to be removed by anæsthetising the eye with a grain of cocaine dissolved in the tears, and five minutes later cutting off the growth with sharp surgical scissors and then cauterising with nitrate of silver. This must be repeated once a week if it is on the sclerotic.

"A. W. T.," Karoonda, has a young horse with wasted muscle on shoulder. Reply—Light work will do no harm now, and a liniment consisting of lin. sapon., Co., with 5 per cent. tincture arnica rubbed in daily will help. Probably some form of embrocation will be obtainable at Karoonda, and will do instead of the liniment if arnica is added.

"F. C. S.," Sherlock, has a colt with swelling under jaw and belly.

Reply—Bloodworms. Give a tablespoon of Fowler's solution of arsenic once daily for a fortnight, and if valuable a teaspoonful of sulphate of quinine twice daily; both can be given in food. He would do much better on lucerne swamp.

"G. M.," Wokurna, had a young horse with the eye hurt by kick, lump from ear to jaw with matter; eye quite white, and blind.

Reply—There is every possibility that the frontal arch has been fractured and splintered, and these must be taken away; the swelling might be tapped at the bottom with a lancet, and any pus contained in it removed. It is to be feared that the sight is ruined, but bathing with warm water containing a few drops tincture arnica might do good. Kindly report later.

"D. Bros.," Meriton, have a mare, chestnut, light, eight years, with swelling on chest at bottom of collar; coughs, and has difficulty in drinking.

Reply—Probably an abscess involving the windpipe; it had better be opened at its lowest part after fomenting well and dressed after with spirit iodine. Kindly report progress later.

"L. C. R.," Wandearah, reports cows affected with dry bible.

Reply—As preventive give a lick composed of four parts benemeal and one part saltpetre; put rusty iron in trough. Treatment—Yeast, syrup of phosphate of iron, two tablespoons twice daily. Nux vomica and bryonia, 30 drops of each tincture every three hours. The case is interesting because of the remark that the bibles are not impacted. This is frequently the case, and shows the absurdity of the name used for the disease, which begins in the muscles, and culminates in the nerves, the stomachs only becoming involved secondarily.

"P. M.," Hookina, reports a mare with hard lump on shoulder, practically on neck.

Reply—This is a little insufficiently described, but seems possibly to be a fistulous wither, the treatment for which in detail has appeared in many recent numbers of the *Journal of Agriculture*. In any case it should be opened right to the bottom and dressed daily with spirit of iodine.

"H. G. P.," Rockleigh, had a horse cut by rusty wire high up on near hind cannon into bone and skin hung down; continually runs matter.

Reply—Cut off the red raw skin and dress the wound daily with spirit of iodine (iodine resub. 1 dram, methylated spirit 1 pint). Dust the place where the matter comes from daily with a little chlorinated lime. Kindly report progress later.

"M. F. L.," Hornsdale, has a blood filly, 16 months, upright on toes and bumble-footed.

Reply—In this case little can be done except to keep the hoofs dressed daily with Stockholm tar and mutton fat in equal parts, and to rasp the feet so as to get a good bearing on the frogs. The bumble foot might benefit by a blister round the coronet made by warming up together eight grains of powdered cantharides in half an oz. turpentine and half an oz. colza oil.

"I. & B.," Waikerie, have a gelding, three years, with enlargement above towards outside of knee; rather hard.

Reply-Probably resulting from an injury such as a kick, the enlargement affects the synovial sac. Try painting daily with tineture of iodine, and if this does not reduce it in a fortnight then blister with binodide of mercury-1 dram to 3 drams

Wollowa Agricultural Bureau seek information for treatment of horses affected with colic; on new hay.

Reply—The household remedies (for which see Journal of Agriculture, "Diseases of Horse') are baking soda, a tablespoon in water with ginger, pepper, or mustard. Ammonia, and best of all, essence of peppermint, with brisk rubbing of belly.

"A. D. I.," Kingscote, K.I., has a mare, aged, stiff after lying down, and has a struggle to get up, walks stiff for a few chains and then goes all right; possibly slipped foal last July.

Reply—The symptoms are those of a complicated case which really wants an inspection to be able to diagnose it. Bloodworms are no doubt one of the complications, but not responsible for much of the stiffness. It is more than probable that there is an internal growth connected with either one of the ovaries or neighboring glands, and possibly affecting the ligamentum teres in the hip joint. Try ten drops tincture arnica morning and evening on the tongue for two or three weeks, and rub the loins daily with the ammonia liniment prescribed in the "Medicine Chest" (Journal of Agriculture of August, 1914). Kindly report in a few weeks as to progress, which is not likely to be much.

"R. S. B.," Yarra Glen, via Morgan, has a gelding hidebound, poor and stiff;

cramp in morning.

Reply-There is most likely an accumulation of sand in the large colon, and possibly worm tumors also. The following treatment will benefit:—Once a day for a tew days mix a pint of milk with a pound of honey and mix with a feed of chaff; if he will not eat it, then it will be necessary to drench him with it. Rub the belly well with a wisp of straw for 10 minutes twice a day. Give 10 drops tincture mux vomica twice a day on the tongue for a fortnight. Then if there is improvement give a tablespoonful of the following powder twice a day in food for a fortnight:-Alb. each sulphur, saltpetre, Epsom salts, and sulphate of iron, and 11b. each of brown sugar and linseed meal.

"C. B. S.," Coobowie, has a calf, nine weeks old, which is blind. Reply—It is possible that too much crushed linseed has been given; it will sometimes produce a form of blindness. There is a possibility of recovery. Stop cocky chaff and substitute hay. Make a blind over the eyes and keep it moist with a lotion of Loz. tineture arnica, & pint methylated spirit, and & pint water. Also give the calf a teacupful of easter oil in a little warm milk as a drench.

"H. C. H.," Pinnaroo, asks for information relating to feeding rye straw to

Reply—Opinions differ as to the advisability of using rye straw for feed. It is hard of digestion, and therefore not advisable for horses. It might, however, do well for roughage for young cattle or old cows in the proportion of one-third rye straw to two-thirds wheat chaff. Its feeding value is low on account of its hard digestibility. The English weight of rye per bushel is 54lbs. The Adelaide weight is 60lbs.

"E. B. P.," Wirrabara Forest, has a horse with a movable hump on side of jaw. Reply—This is a cheekstone, or salivary calculus: it may be removed by cutting from the outside, but care must be taken not to sever the salivary duct in which it is completely enclosed or a salivary fistula will be established that will require a very delicate operation to reduce. The gut should be on the top of the duct along its length. The stone may be removed with the handle of a tenspoon. The wound will have to be pinned together and treated with an antiseptic, such

"E. B. B.," Wirrabara Forest, has a horse, aged, which will not drink enough for health.

Reply—"One man may lead a horse to the water, but 20 cannot make him drink," says the proverb. Stop the salt, which is probably injuring his digestion without inducing thirst. Examine his teeth; it is highly probable that the pain of a defective molar is his reason for not drinking. If he gets a sufficiency of green fodder he can do with a very small quantity of water.

"E. B. P.," Wirrabara Forest, has a mare, a bad kicker, and injured legs.

Reply—To let her kick till too sore would be bad horsemanship, and sailing too near the wind of the Cruelty Act, as would also the starvation treatment, which would not be effective. Try hanging a bag of chaff behind her so that it will swing to her kicking and bump in return for each kick; she will tire before it does. In the dray twist a rope across the shafts so that she will eatch her hocks instead of hitting the wood with her legs. The treatment for the sores should be tincture arnica loz, to a pint of methylated spirits applied twice a day. Doping with an oz, of chloral hydrate an hour before harnessing might dull her sensibility enough to prevent the kicking, which she would renew on the next occasion. Why not put her in a good breaker's hands?

Riverton Agricultural Bureau report a horse with swelling on wither, first noticed last November; breaking and discharging, probably caused by being savaged by another horse and knocked through a gateway.

Reply—It is quite possible that there is a piece of wood in it, but it is more likely to be dead tissue forming a fistulous wither, the treatment for which is surgical, and has been described in these columns during the last year.

"W. H. L.," Aberdeen, has a sow which was in too good condition; was para-

lysed, and mad savage after farrowing; has now partially recovered.

Reply—The trouble was purpural eclampsia. She might be bred from again, but should be kept on the poor side during pregnancy. An ounce of Epsom salts in her food daily for a week would do her good now, and could be followed by a teaspoon of sulphur and a handful of cinders daily in her food for a month.

"W. A.," Curramulka, has a colt, three years, which a month ago started to stagger and fall; paralysis of hindquarters and head has set in.

Reply—As suggested, death will probably have occurred before the reply is received. The disease is toxacmic paralysis, which is connected with the presence of biting flies in the earlier season, and bloodworms. Had treatment been available it should have been half a pint of castor oil in a little warm milk as a drench, then twice a day two tablespoons of Fowler's solution of arsenic and a teaspoon of sulphate of quinine.

"W. E. H.," Miltalie, has sheep which go blind.

Reply—It is a pity your Journal has not come to hand lately, for each menth there have been replies to this inquiry. Cause, parasital anamia. Treatment—Two Cooper's tablets daily for a few days, and a little boracic acid and carbonate of ammonia blown into the eyes occasionally.

"M. Bros.," Sandy Creek, have a mare which was recently purchased; in feal, light work, nervous and sluggish, shivered in hand quarters, and lay down, rose all right a few minutes later; this happens daily, with weakness and sweating.

Reply—Without an examination it is impossible to say whether the condition arises from a weakness in the circulation, or is of nervous origin. It has the sound of being in existence some time, and may possibly be a case of thrombosis of the iliac artery, caused, possibly, by bloodworms. Otherwise the mischief lies in the spinal cord. Treatment will probably not be of much use, but a dram of iodide of potassium in the food twice daily for a week or two might effect some improvement.

Gradock Agricultural Bureau report that sheep, wether hoggets, die, appear to be blown, and when opened there is fluid in the body cavities.

Reply—The disease is the one the Veterinary Lecturer demonstrated at Cradock before Christmas. It is known as Surcosporidiosis, and is caused by the multiplication of parasites in the blood and muscles. The fluid in the body cavities is not due to stoppage of water, but is a dropsical effusion, and it will have been noticed to have a peculiar smell. Treatment consists in frequently changing paddocks, and leaving them empty of sheep for at least a week before restocking. An affected sheep, taken early, when it is just staggering, will be relieved by being bled at the eye vein. In the case of hand-fed sheep or valuable, two of Cooper's tablets daily for a few days are useful.

"Columbia," Port Pirie, has a horse, seven years, which eats dung, and is out of sorts.

Reply—The symptoms point to indigestion. Give a table-poonful of the following powder twice a day for 10 days in feed:—Sulphate of iron, sulphur, saltpetre, resin, gentian, a quarter of a pound of each mixed with a pound each of brown sugar and linseed meal.

"L. A. C.," Lenroy, Pata, has a cow affected with dry bible.

Reply—It is to be feared that the cow will be dead before the reply reaches you. So far your treatment has been good, but it might be well to continue the syrup of phosphate of iron, and to give in addition 20 drops of tineture bryonia three times a day.

"J. A. M.," Allandale East, has a cow with scaly lump on hip.

Reply—This is probably of a warty nature, and not likely to affect the milk. As the cow is near calving it would be better to leave it alone till after the event, then sear it off with a red-hot iron and dress the stump with powder sheep dip.

"J. H. C.," Aldinga, has a horse which struck ground at jump, landing on head and neck. Quite blind in eye fallen on, though ball is bright.

Reply—There has been injury to the optic nerve, and it is doubtful if sight will However, try the following treatment:-Mix loz. tincture arnica with ½ pint methylated spirits and ½ pint water; hang soft cloth over eye from forehead band of halter, and keep moist with lotion. Kindly report progress in a week or 10 days.

"W. M. H.," Redhill, has a horse which received a severe blow on shoulder.

Reply—Foment freely and often with hot water, and afterwards apply a little lotion composed of tincture arnica loz., methylated spirits 1 pint. injury to the bone, which will take months to recover. Kindly report progress in a few weeks.

"W. H.," Penrose, Blyth, has a sow, due in a month, weak, hunched in back;

difficulty in passing dung and unable to retain urine.

Reply—The symptoms appear to be those of a bad infestation with worms. Make the following powder, and give a tablespoonful twice a day in food: -One ounce each carbonate of iron, bicarbonate of soda, sulphur, nux vomica, half a pound each crushed castor beans, brown sugar, one pound powdered animal char-Kindly report progress at farrowing.

"S. T.," Bute, had a yearling heifer, which after rushing, bellowing, and exciting other cattle, died in morning. Big bruise on right shoulder, but no mark on

Was fat, and had just been put on extra good feed.

Reply—The symptoms are those of quarter evil or black leg, a bacterial disease affecting the muscles, hence the appearance of a bruise without kin marking. disease affects young stock that are improving fast, so it would be well to check This can be assisted by putting a seton through the dewlap and dressing it occasionally with Venice turpentine. There is a preventive vaccine for black leg as well, but this has to be carried out by a qualified veterinary surgeon. Treatment of an affected animal is not much good, and where one has died others may be expected to. Treat the disease as contagious, and isolate and disinfect.

"E. B.," Tumby Bay, has a mare with wet tips to ears after a day's work; cold

in morning.

Water before feeding only. Give same powder as Reply—Chronic indigestion. for previous mare, and also 15 drops tineture nux vomica twice a day on tongue for a month or so. Kindly report progress.

"E. B.," Tumby Bay, has a draught mare, eight years, in low condition, and

suffering from last year's drought.

Reply—Try a tablespoon of the following powder twice a day in food for a few weeks:-One quarter pound each of sulphate of iron, sulphur, resin, saltpetre, gentian, calumba, one pound each of brown sugar and linseed meal.

"E. B.," Tumby Bay, has a horse with indistinct wound on heel with ca

matter dropping from it continually.

Reply—It would appear as if the injury involved the oilsac of the large tender Poultice with bran for a few days, and then dress twice daily with spirit of iodine (iodine resub. 1 dram, methylated spirits 1 pint). Kindly report progress in a fortnight.

"J. H. C.," Aldinga, reports that a mare was cast in stall and hurt back. Reply—It is probable she will always be "chink-backed." However, the following treatment will benefit. Rub back daily with the following limiment:—Camphor 2 drams, turpentine 202s., rape oil 502s., strong ammonia 3 drams, liq. potass. 3 drams, tincture arnica 4 drams.

H. V. B.,'' Lucindale, has a mare off feed, bowels uneasy, swelling under jaws, mouth, and belly, losing condition during last few weeks, and passing small worms in dung; in foal.

Reply—The cause of the trouble is bloodworms. Give two tablespoons of Fowler's solution of arsenic in feed once daily for a fortnight, stop a fortnight, and repeat a third fortnight. During the six weeks also give a flat teaspoonful of sulphate of quinine twice daily in food, or, if refused, in a little molasses smeared on tongue.

"F. C.," Carpa, reports troubles as follows:—(a) Calf went off milk at a fortnight, throat swelled, could not swallow, so was knocked on head; (b) foal kicked on hock two years ago, has lump on hock; (c) foal could not suck, and died in two days.

Replies—(a) Symptoms point to necrotic ulceration of the throat; nothing could have been done. (b) The lump on hock is a permanency. (c) Malformation of the soft palate caused the inability to swallow, and nothing could have been done.

"D. C. S.," Burley Downs, has a dog troubled with fits and panting; stiff behind.

Reply—Worms. Clear bowels with castor oil, and give areca nut or tobacco. Presuming it is a cattle dog, two tablespoons castor oil, as much areca as will lie on a shilling, or a fair quid of tobacco.

"D. C. S.," Burley Downs, reports a horse stiff, as if foundered.

Reply—The oats are not the cause, which must be sought for elsewhere, such as a chill. Treatment—Ten drops tincture aconite morning and evening for 10 days, and soften the feet with wet clay or poultices.

HORTICULTURAL INQUIRIES.

The Penola Agricultural Bureau ask if good potatoes could be obtained if grubeaten seed were used? The Horticultural Instructor replies:—"A potato tuber damaged by the larvæ of the potato moth will not necessarily reproduce tubers affected by that pest. Assuming the injury is not sufficient to cause the tuber to rot rapidly in the soil when planted, and that the pest has not seriously injured the best eyes or buds on it, there is no reason to doubt its power to produce a plant which in turn will give good tubers. As a general proposition, however, damaged tubers are not recommended for seed purposes."

Beetaloo Valley Agricultural Bureau report that orange trees, which are being watered, do not thrive, and are of a yellow color. In reply the Horticultural Instructor states:—'Assuming the tillage and character of the soil are favorable, I suggest the trees be treated with two or three monthly dressings of sulphate of ammonia or nitrate of soda, giving about $\frac{1}{2}$ lb. to each tree when watering same. Dissolve the sulphate in a ring opened just outside the spread of the foliage. Read article in the Journal for July, 1915, page 1077.''

AGRICULTURAL INQUIRIES.

"G. W.," Mypolonga, seeks information as to a means of improving the condition of grey clay, which worked up powdery, and set hard when watered; also rate of seeding for lucerne; what cover crop to sow, and the amount of bonedust to apply. The Superintendent of Experimental Work (Mr. W. J. Spafford) says:—"It does not make much difference whether you use flour of gypsum or lime to overcome the bad mechanical condition of the soil you describe, providing the gypsum is really fine. Apply after the land is cultivated, and only work in with harrows, for it is at the immediate surface that you want it to work, and lime in any form washes only too quickly into the under layers. Fifteen to 201bs. of lucerne seed to the acre will give a first class stand; and if you are using the bonedust to obviate the necessity of frequently fertilising the crop, do not be afraid to apply it heavily; 2cwts. to 3cwts. per acre being the minimum quantity used. You will find, once you have the crop growing, that it will more than repay you for the outlay if you manure it with say superphosphate every winter. If you intend sowing the seed now (autumn) either barley, rye, or an early oat will make a good cover crop to protect it from frosts, using in every case only ‡bush. to ½bush. to the acre. Should you intend sowing in early spring use Cape Barley as the cover crop.''

"E. M.," Meribah, desires information relating to cross drilling wheat and oats. The Superintendent of Experimental Work (Mr. W. J. Spafford) replies:—"If you intend growing a mixture of white oats and one of the wheats you mention for hay, use the Yandilla King and drill from 30lbs, to 40lbs, of oats one way, and then drill 40lbs, to 50lbs, of Yandilla King wheat in the opposite direction, using about ½ewt, superphosphate each time. If the mixture is for feeding off purposes use Glayas wheat, as this will come early, and the oats should be giving you plenty of green feed in the late spring, when the Glayas is finished.

In reply to the Wollowa Branch, the Superintendent of Experimental Work Mr. W. J. Spallord says:—Inquiry No. 1—"If lucerne seed be required, from which cut is it best to obtain it—First, second, or later cuts?" Reply—The crop of lucerne to be saved for seed is wholly controlled by the water supply and the climatic conditions prevailing during its growth. In this country the second cut should be a good one for seed, providing the climatic conditions during its growth are favorable, and it should be handled on the plan that rankness of growth does not encourage the production of seed. The first cut should be watered and handled in the ordinary way, but after the cutting only enough water should be applied to start a healthy, vigorous growth without any tendency to rankness. If heavy rain should fall while the lucerne is in flower it is practically a certainty that the setting of the seed will be poor, so it should be cut for hay. Even if rain in quantity comes after the seed has set, the chances are that a second growth will start, resulting in the seed ripening very unevenly, so it should be cut for hay. If the blooms fall quickly, the crop should be closely examined, and if the flower stems are found to be bare instead of carrying seed pods, they should be cut for hay. Should any of these occurrences force the cutting of this crop for hay, try again with the third The first is sometimes a more convenient on e to handle; if so, it should make its growth without any irrigation whatever, unless the latter end of the winter has been exceptionally dry. Inquiry No. 2.—
"How long is it possible to keep pickled wheat before it becomes unfit to sow, and is it advisable to pickle some time before sowing, bluestone being used as a pickle?" Reply-Wheat that has been pickled with a bluestone s lution does not deteriorate by keeping. Indeed the germinating power of pickled seed long kept, is much higher than that recently pickled. To keep seed that has been pickled with bluestone it is essential that it be thoroughly dried before being rebagged. It is certainly advisable to pickle with bluestone some time before sowing, as it can be done before the busiest part of seeding operations are on; the germination of the grain improves, the seed is easier to handle and runs freer in the drill, and the effect of the "pickle" is not lessened in the drying. Inquiry No. 3.—"Would it be beneficial to mix ashes with super. and drill in?" Reply-Ordinary superphosphate is never sticky nowadays, so does not need any drying to make it run freely through the drill, so the only advantage of using ashes mixed with the superphosphate would be in the potash contained by them. As the quantity of this present is so small in the amount you would get to run through the drill, the chances are the extra crop received would not pay for the labor of collection and mixing.

VITICULTURAL INQUIRY.

"G. H. H.," Kybybolite, forwarded vine specimens.

Reply—The Viticultural Instructor (Mr. H. E. Luffer) says:—'The trouble is one commonly known as ''hen and chickens,'' and is particularly prevalent this season. It is purely physiological in its nature, and is not caused by parasitic attacks. Most probably it is the result of an imperfect fertilisation, due, possibly, to seasonal conditions at flowering time. Some varieties are very frequently affected. There is no specific remedy, but if the vines are kept open at flowering time, admitting sunlight to the bunches, it may improve the setting. The substance on the under surface of the leaves is only the natural ''down or cobweb'' of the variety. The leaves were too dry and the fruit too squashy to make the identification conclusive, but the larger leaved variety might be Black Prince. The other was beyond identification.''

ROSEWORTHY AGRICULTURAL COLLEGE.

HARVEST REPORT, 1915-16.

By W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., Principal Roseworthy Agricultural College.

GENERAL REMARKS.

The record drought of 1914 was succeeded by one of the most bountiful harvests yet experienced in this district. Influenced by the needs of the Empire, the College, like most farmers, increased the cropping area to the utmost limits of the farm with due regard to the future. The failures in certain fields in the preceding season made it possible to do this without causing any serious upsettal of the general scheme of crop rotation and without involving much additional outlay on preparatory tillage operations. The total area devoted to cereal crops was 776.074 acres, and in addition there were 124.596 acres under pulse and other forage crops, making a total of 900.670 acres under cultivation during the year.

It was a fortunate coincidence that the seeding of such a large area—more than half of the arable portion of the farm—took place in a year of good rainfall. With the exception of one field, which became flooded, all the farm crops prospered, and we have had to cope with by far the heaviest harvest ever experienced at the College. Binders, strippers, harvester, reaper-thresher, and English thresher were all pressed into service, and additional vehicles had to be secured in order to complete the harvest by the 15th of February. In all, we have stored over 200 tons of ensilage, 806 tons of hay, 250 tons of straw, and approximately 9,450 bushels of grain.

THE WEATHER.

The past season was characterised by early autumn rains, a wet mild winter, a moist, early spring almost devoid of frosts, and a dry, Plant growth under these conditions was relatively cool summer. naturally very rapid and prolific. The crops grew vigorously right through the winter, and some of the earliest sown on light land began to shoot into ear before the middle of July. Unfortunately it was impossible to correct this "winter proudness" by grazing, as all the stock were required to feed off the abundance of clover and dandelion in front of the fallowing teams. Two small fields were cut for ensilage about the middle of July, and subsequently they yielded a second growth that averaged within 28lbs. of 2 tons of hay per acre. This serves to illustrate the remarkably stimulating influence of the season on crop development. The following tables contain particulars of the 1915 season as recorded at the Roseworthy College Meteorological Station:-

Table I.—Showing Monthly Rainfall at Roseworthy College for Seasons 1911-1915 inclusive, together with the Mean Fall for each Month during the period 1883-1914 (32 years).

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,						Means,
	1911.	1912.	1913.	1914.	1915.	1883/1914.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January	0.00	0.09	0.11	0.27	0.81	0.81
February	2.13	0.21	1.94	1.62	0.04	0.58
March	0.66	0.70	1.63	0.73	0.30	0.90
April	0.33	0.91	0.31	1.38	1.95	1.68
May	1.79	0.19	0.31	0.94	3.01	1.72
June	2.33	1.68	0.22	0.45	4.61	2.50
July	1.56	1.87	0.69	1.32	1.89	1.85
August	0.68	3.19	1.64	0.39	1.83	2.03
September	2.35	2.43	2.55	0.29	3.56	1.77
October	0.37	0.94	3.89	0.08	1.27	1.66
November	0.04	1.84	1.21	1.27	0.21	1.05
December	1.44	0.92	1.16	0.62	0.28	0.79
		*	-		****************	plant of the last
Totals	13.68	14.97	15.66 •	9.36	19.76	17.34

Table II.—Showing the Distribution of "Useful Rain" in the Years 1911-1915 inclusive, together with the Means for the previous 32 Years.

						Means.
	1911.	1912.	1913.	1914.	1915.	1883/1914.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Seeding rains (April/May)	2.12	1.10	0.62	2.32	4.96	3.40
Winter rains (June/July)	3.89	3.55	0.91	1.77	6.50	4.35
Spring rains (Aug./Oct.)	3.40	6.56	8.08	0.76	6.66	5.46
Summer rains (November) .	0.04	1.84	1.21	1.27	0.21	1.05
Totals	9.45	13.05	10.82	6.12	18.33	14.26

Table III.—Showing Particulars of Weather experienced at Roseworthy College during the Year 1915.

January	. Rainfall. E Inches.	on No. of days on which rain fell	rai	ortant ns. Inches.	A Minimum c, tempr. deg. Fahr.	G Mean minimum Fempr. deg. Fahr.		rosts. Temp	110	∞ Mean max. tempr. ∵ deg. Fahr.
February	.04	2			49.1	63.5			108.9	89.0
March	.30	5	7/9	.24	44.0	55.2			99.0	79.7
April May	$\frac{1.95}{3.01}$	$7\\12$	8/12 $12/21$	$\frac{1.78}{2.80}$	41.5	51.2			89.5	72.0
June	4.61	16	25/26 6/8	.21 .71	35.9	46.9	11	35.9	82.5	64.0
			17/29	3.90	38.0	47.6			75.8	61.6
July	1.89	14	5/11 18/21 30/31	.50 .74 .64	34.0	43.5	12 13 14 15 26	35.5 36.2 37.2 34.0 37.4	68.2	60.2
August	1.83	14	2 5/12 23/24	.34 .83 .48	33.0	43.2	17 28 29	$36.2 \\ 36.0 \\ 33.0$	71.3	61.3
September	3.56	15	$ \begin{array}{r} 11 \\ 14/16 \\ 19/20 \\ 24 \end{array} $.46 1.59 .61 .48	39.0	46.2			80.8	66.4
October	1.27	9	21/24	.88	37.5	47.4	6 7	$39.2 \\ 38.7$	91.6	70.8
November	.21	2	15	.16	38.0	49.3	$\frac{16}{24}$	39.0 38.0	100.8	76.9
December	.28	2	5	.27	42.9	54.7			106.0	86.6
Totals	19.76	103					9 I	Frosts		

Reviewing the rainfall figures, one notices in the first place that the total precipitation measures 2.42in. above the mean fall for the pre-

vious 32 years. This marks the year 1915 as one of good, but by no means excessive, rainfall. On no fewer than eight occasions during the past third of a century the annual rainfall has been higher than 19.76in. The figures for the four years of heaviest rainfall, 1890, 1889, 1909, and 1910, were respectively 27.58in., 25.74in., 24.05in., It has rarely happened, however, that so much of the total rain has been of a useful character. No less than 18.33in., or 92.76 per cent of the total rain in 1915 fell between April 1st and November 30th. Not only did the rain fall during the period when it could benefit the crops, but in addition it was distributed fairly evenly in serviceable showers over that period, and hence plants were able to derive almost a maximum amount of benefit from it. glance at Table III. will show that the season opened during the second week in April with a fall of 13in. Then followed a month of fine seeding weather which was succeeded by 10 showery days, averaging over lin. each. This established the first sowings and favored the cleaning of the later seed beds. We then experienced a fortnight of good drilling weather, and were thereby enabled to complete the cereal seeding in good time, notwithstanding the fact that the area to be sown was the largest ever undertaken at the College.

It will be admitted, then, that the seeding season was almost an ideal one; and with regard to the winter rains, it may be said that, though heavier than usual, they were not harmful except in one or two special cases. The spring falls were copious at first, but the promise of September was not fulfilled, for both October and November fell below the mean figures. The abrupt change from the wintry conditions of September to the dry, flaggy weather of October and November was not without effect on the crops in this district. caused a number of them to ripen too quickly, and this detrimental influence was aided by the early development of red rust, with the result that the grain was only partially filled when it reached matu-The shrinkage of the grain was greater than it would have been had the earlier weather been such as to encourage the development of a more elaborate and sustaining root system. The effective the change were naturally most marked on the late sown crops situ ted on heavy black land, and least on the pine ridges.

It should not be overlooked, however, that the dry weather gave a decided check to the *Puccinia Graminis* fungus, which at one stage threatened to work havoc amongst the crops. The sappy tissues that develop under mild winter weather are probably less resistant to disease than vegetation that has survived harder and more rigorous conditions. It will be noted that the mean maximum and minimum temperatures were wonderfully even throughout the autumn and

winter months, and that the season was characterised by relatively few frosts. In July, four successive frosts occurred between the 12th and 15th, but the crops did not suffer to any extent, nor were they noticeably checked by the brief frosts that occurred in August, October and November. Unlike some districts further north, we escaped the September frosts, which are so apt to do injury at flowering time.

In summary, it may be said that the season was both mild and moist, and therefore favorable to all forms of plant life, useful and parasitic. Light and irregular pickling was found to be ineffective against bunt, and in our own barley crops we had evidence of the folly of incurring the risk of disease when a simple and inexpensive remedial measure is available.

From a farmer's point of view, 1915 was a better "grass and hay" year than a "grain" season in this district, and I doubt if we shall ever see more luxuriant fields of mixed "grass" herbage than were our proud possession in the winter and spring months of the past season.

BERSEEM CLOVER.

One of the earliest crops sown at the College is berseem clover (Trifolium Alexandrinum). This is a winter growing legume, introduced from Egypt by the Director of Agriculture in 1911, since when it has been regularly and successfully cultivated here under irrigation to the extent of 4 or 5 acres per annum. It is essential to have the seed sown before the soil becomes cold and wet. In this district, March is usually the most favorable month, and our practice is to dress liberally with farmyard manure and cultivate down to a fine tilth before sowing. Last year four plots, H, EF, L, and M, were devoted to berseem, and they were all sown between March 19th and April 23rd. The total area sown was 5.752 acres, and during the season 160 tons 7cwts, 106lbs, of greenstuff and 2 tons 5cwts, 30lbs, of berseem hay were cut and carted to the steading. This works out at an average yield of 27 tons 17cwts, 79lbs, of green forage per acre. Appended in tabular form are the results of our experience with this crop for the last four years. Only crops used exclusively for green forage are referred to in this table:-

Table IV.—Showing Yields of Greenstuff Obtained from Irrigated Berseem Clover at Roseworthy College, 1912-1915.

Year		Arca.	T	otal yie	eld.	Yie.	ld per a	icre.
		Aeres.	Tons.	cwts.	lbs.	Tons.	ewts.	lbs.
1912		1.19	38	12	56	32	9	18
1913		3,201	108	19	97	34	0	111
1914	·	2.294	46	16	94	20	8	43
1915		3.411	98	16	66	28	19	53
Means						28	19	56 *

About $1\frac{1}{2}$ acres were grown in 1911, and the first two cuttings averaged 16 tons 7cwts. 37lbs. per acre. The third growth was left for seed, hence the complete figures for 1911 are not available.

ENSILAGE CROPS.

At the opening of the year two of the silos contained sorghum and maize ensilage. The crops used to fill these silos were grown under irrigation. In plot G, Giant Horse Tooth maize was sown at the rate of 28lbs, per acre on September 7th. The field was previously dressed with 20 tons of farmyard manure to the acre, and at seeding mineral superphosphate (2cwt. per acre) was drilled in. The whole area (1.405 acres) was cut and chaffed into the silo two days before Christmas, and was found to yield 15 tons 2ewt. 6lbs., or 10 tons 14cwt. 110lbs. per acre. The sorghum crops—early amber cane—did not yield so well, but they were not grown under such favorable cir-The plots on which these crops were raised—plots cumstances. L, M, N, and EF-were not dunged, and plot N did not receive as From the total area (4.966 acres) many waterings as the others. 28 tons 19cwt. 70lbs. of green fodder were obtained, and this works out at 5 tons 16cwt. 80lbs. to the acre. In addition, the sorghum stubbles provided a fair second growth which gave useful grazing. Owing to the inequality of the conditions, these yields of maize and sorghum are not comparable; but lest an erroneous impression should be created, it may be well to state that the sorghum crop in plot N returned 9 tons 3cwt. 29lbs. per acre, and when the aftermath i added to this tonnage, the yield will be seen to approximate ver closely to that obtained from the maize crop.

Small patches of berseem, lucerne, and field pease were also ensiled and a disused underground tank in Grainger's B was used to store a quantity of natural feed cut and carted from the depth of ploughin plots that required to be fallowed.

As usual, however, the bulk of the ensilage was made from ove grown wheat crops. The fields concerned were No. 1 Pig Paddock 1.7, Irrigation Plots N.O., and a small portion of Flett's. The following table contains the results obtained in these paddocks:—

Table V.—Showing Particulars of Cereal Ensilage Crops grown in 1915.

Area.	Tot	al yield.		Acre vi	eld.
Acres.	Tons.	cwts. Il	os. Tons.	. cwts.	TOS
11.460	62	6 10	8 5	18	85
3.658	26	14 4	17 7	. 6	11
2.960	12	17 - 16	60 4	7	16
6.016	32	19 2	22 5	9	64
3,290	18	16 4	18 5	14	47
					
27.384	153	14 10	07 5	12	33
	Acres. 11.460 3.658 2.960 6.016 3,290	Acres. Tons. 11.460 62 3.658 26 2.960 12 6.016 32 3,290 18	Acres. Tons. cwts. II 11.460 62 6 10 3.658 26 14 2 2.960 12 17 16 6.016 32 19 5 3.290 18 16	Acres. Tons. cwts. lbs. Tons. 11.460 62 6 108 5 3.658 26 14 47 7 2.960 12 17 160 4 6.016 32 19 22 5 3,290 18 16 48 5	Acres. Tons. cwts. lbs. Tons. cwts. 11.460 62 6 108 5 18 3.658 26 14 47 7 6 2.960 12 17 160 4 7 6.016 32 19 22 5 9 3,290 18 16 48 5 14

FIELD No. 1.

This is a handy little "home" paddock, which has usually been reserved for mares and foals or stud lambing ewes. The past history of the field is as follows:—1898, wheat; 1899, stubble; 1900, Calcutta oats; 1901-1906, pasture, 1907, ensilage crop; 1908-1913, pasture; 1914, sorghum (failure).

From this summary it is apparent that the land was in good condition for a cereal crop, and the fertility that had accumulated throughout the preceding six years of grazing stood to the 1915 cereal crop, and enabled it to create a new record in total produce per acre. soil is sandy in character, but the field is traversed by bands of limestone which in earlier days caused it to be left out of cultivation for The sorghum crop having disappointed us, it protracted periods. was decided to scuffle up the seed bed and sow it early with King's White selection 6 for an ensilage crop. Two bushels of seed and 1cwt. of mineral superphosphate per acre were sown on April 12-13. and the drilling was harrowed four days later. The growth was so abnormally rapid that in June a small flock of sheep were turned in to graze it back, but the crop shot away from them, and before the middle of July a number of bearded heads made their appearance. This forced us to start silage cutting in the winter, an unusual practice in this district, and one not to be recommended generally, as it is more difficult to manufacture first class ensilage from soft, watery growth, and moreover, weather conditions at that season are not favorable to the work. The total tonnage of greenstuff was 62 tons 6cwt. 108lbs., and the yield per acre 5 tons 18cwt. 85lbs. The subsequent history of the field will be found under the section of the report dealing with hav crops.

PIG PADDOCK B.

In this field also stock droppings and a lengthy period of rest from cereals served to encourage the 1915 wheat crop to pass from the grain stage to that of ear production at an abnormally rapid rate. In 1911 a crop of Cape barley was grown on it, and from then till the summer of 1914 it was regularly depastured with pigs. The Early Amber cane sown the first week of December, 1914, never appeared above ground, and the field was subsequently worked over and sown with a cereal mixture on lines similar to those adopted in Field No. 1, except that the amount of manure used was 140lbs. per acre. The crop also received similar treatment at harvest time, but no stock were

turned into it during the winter, and probably this may account for the higher return obtained. The silage crop—zut July 23-28 yielded 7 tons 6cwt. 11lbs. per acre, and particulars of the hay harvest off the same seeding are set out later on in the report.

Plot N.O.

The yield from this plot—1 tons 7cwt. 16lbs, per acre—is much below the average, but this may be adequately explained by reference to the presence of a number of large gumtrees on the eastern boundary. The crop, which was drilled on April 16th, at the rate of 2bush, of seed (King's White selection 6) and 2cwts, of standard superphosphate per acre was cut and carted to the ensilage pits on September 3rd. It need scarcely be added that although grown on an irrigation plot this crop did not receive artificial watering, and I doubt much if it could have used any additional supplies to its advantage.

FLETT'S.

The history of this extensive field will be given in connection with the hay crop. A small strip against the southern fence was sown with King's White selection 6 earlier than the balance of the area, and this being ready at the time, it was used to complete the silage harvest for the year. The depreciating influence of the marginal scrub on the returns would not be inconsiderable in the case of so small an area as 6.016 acres, and in considering the yield (5 tons. 9cwts. 64lbs. per acre), it is important to note that the crop grew on a 1914 barley-failure, received only 1cwt. of manure, and, in addition, was drier than is desirable for silage at the time of cutting. The stubble started to shoot again in the spring, and produced a second growth of feed about 18in. high.

RELATION BETWEEN CEREAL CROPS CUT FOR ENSILAGE AND THE AMOUNT OF TWINE USED TO BIND THEM.

It has been customary to take careful notes on the twine requirements of the College hay crops during the last four or five seasons, and during 1915 attention was also given to the amount of green cereal crops bound per ball of twine at the time of ensilage-cutting. Conditions were not normal last year, inasmuch as 15 out of the 27 acres of crop bound for silage were harvested in the month of July, before the growth had attained the proper state of maturity. To some extent this departure from ordinary procedure will have been

counterbalanced by the over-ripening of the crop in Flett's. In any event, the mean results obtained from a series of figures covering several years' operations will furnish a reliable measure of the relationship under consideration. For the year 1915 we found that it took on the average one ball of twine to bind every 4 tons 7cwts. 55lbs. of greenstuff, these figures being calculated over an area of 27.384 acres, yielding in all 153 tons 14cwts. 107lbs.

GENERAL SILAGE RETURNS.

It is always interesting to compare the results of the season's work with those secured in former years and to note the difference between the single season's figures and the corresponding means over a long period of years. With this object the appended table, submitting yields of ensilage crops—mainly cereals—grown at the College since 1905 is included. In 1906 and again in 1909 remarkably fine crops were grown, and they averaged nearly twice the acre-vield of the past season. The only fair criterion by which to judge the silage crops of any particular year, however, is the mean yield of 10 or more successive seasons, and adopting this practice we have to face the fact that the 1915 figures fall below the means for 1905 to 1913 to the extent of 1 ton 6cwts, 60lbs. The main reason for this is that the crops were not allowed to develop fully, lest they should go down, and cause endless trouble with the binders. Had this risk been accepted, there is every reason to think that the 1915 average would have been at least 3 to 4 tons higher per acre than was actually obtained. However, by so doing we should have sacrificed over 30 tons of hay.

Table VI.—Showing Yields of Ensilages, 1905-1915.

			Raint	fall.							
Year.			"Useful"	Total	Area.	\mathbf{T}	tal yie	ld.	Yield	per a	ere.
			Inches.	Inches.	Acres	Tons.	cwts.	lbs.	Tons.	cwts.	lbs.
1905			14.23	16.71		-			8	10	0
1906			16.31	19.73	9.50	113	.1	0	11	18	O _P
1907			13.96	15.13	17.15	92	2	75	5	7	34
1908	٠.		15.52	17.75	17.00	129	10	76	7	12	44
1909			21.15	24.05	16.962	169	18	90	10	0	3.
1910			16.79	23.87	15.490	134	1	43	8	15	32
1911	٠.		9.45	13.68	30.740	152	16	28	4	19	47
1912		P.	13.05	14.97	40.700	141	4	73	. 3	9	45
1913	.,		10.82	15.66	61.511	115	14	24	1	17	70
1914			6.12	9.36	· · · · <u>/</u>						- 1
1915	, · ·	٠.	18.33	19.76	27.384	153	14	107	5	12	33
1905/	191	5.			A	verage f	or 10	venrs	6	16	20

THE HAY CROPS.

At the commencement of the 1915 hay harvest, we had barely a month's supply on hand, and it was therefore advisable to set aside for hav cutting an unusually large area. The consumption of hay when the stock are receiving full rations amounts to over 30 tons per month, and it was our endeavor, calculating on a 2-ton average yield, to reserve for hay an area of sufficient dimensions to furnish us with approximately two years' supply. This we have succeeded in accomplishing, and whilst it may seem unnecessarily cautious to be cutting hay from 341 acres out of a total of 776, yet we were justified, inasmuch as we should not have been able to cope with a larger grain area; and moreover, at the time the decision had to be made there was no reason to think that an average hav cut would be of less value than an average grain yield. With the exception of the hay from the various headlands, the whole of the 806 tons consists of wheaten hay cut from crops of King's Red and King's White varieties. The former came out with an average yield of 2 tons 2cwts. 86lbs. per acre. and the latter with 2 tons Sewts. 89lbs. per acre. The following statement summarises the results of the year:-

Table VII.—Showing Particulars of 1915 Hay Harvest.

Field.	Area.	Tot	al yiel	d.	A	cre yie	ld.
	Acres.	Tons.	cwts.	lbs.	Tons.	cwts.	lbs.
Grainger's A	27.247	57	12	6	2	2	32
Grainger's C	14.100	24	4	82	1	14	42
Island A	34.208	67	19	1.7	1	19	82
Island B	41.147	93	3	44	2	5	32
Flett's	168.957	440	17	41	2	12	21
Pig paddock B	3.658	8	1	58	2	4:	17
Field No. 1	11.460	21	19	42	1	18	38
Headlands	40.872	92	9	82	2	5	29
Totals	341.649	806	7	36	***********		CONTROL NO. OF SQUARE
Average yield per	acre				2	7	23

GRAINGER'S A.

In 1912 it was decided to subdivide this field into a number of 4-acre plots, with the object of inquiring into the influence of different modes of fallowing on the growth and development of wheat under our climatic conditions. The field is adjacent to the depth of ploughing plots, and consequently the rain gauge readings that apply to the latter also indicate the rainfall on these cultivation plots about to be considered. In the following table is set out the monthly rainfall for

the seasons 1912-1915 inclusive, together with the means for the four-year period.

Table VIII.—Showing Amount of Rain Registered in Rain Gauge located in Grainger B, 1912-1915.

					Means.
	Inches.	Inches.	Inches.	Inches.	Inches.
	1912.	1913.	1914.	1915.	1912/1915.
January	0.07	0.07	0.21	0.66	0.25
February	0.11	1.39	1.98	0.02	0.87
March	0.56	1.34	0.71	0.27	0.72
April	0.68	0,26	0.83	1.76	0.88
May	0.13	0.25	1.02	3.04	1.11
June	1.56	0.16	0.48	3.35	1.39
July	1.73	0.64	1.17	1.62	1.29
August		1.48	0.30	2.35	1.77
September		2.62	0.41	3.51	2.19
October		3.51	0.06	1.45	1.65
November		1.34	1.42	0.21	1.05
December	0.57	1.05	0.62	0.28	0.63
Means	13.41	14.11	9.21	18.52	13.80

Although distant not more than two miles from the central rain gauge, the mean fall on these plots for the past four seasons is found to be 1.14in. below the amount registered at the College. This is an appreciable difference, and in the first two seasons the discrepancy rose to over 1½in. per annum.

In three out of the four seasons under review it will be noted that the spring rains were heavy relatively to the winter rains, a fact which would tend to favor the plots set apart for late fallows. On the whole, however, the rainfall on the fallows up till 1914 has been considerably below the average for the district. In 1914 the fallows received only 5½in. between ploughing and seeding, and it is the crops grown on these fallows that now concern us.

The scheme of the work in hand in this field and a record of the tillage given during 1914 to the plots harvested this season are detailed below:—

Plan of Experiment. Early Fallows.

- Ploughed 7in. deep and immediately rolled with heavy roller.
 Cross cultivated before September 1, and harrowed immediately after.
 Cultivated, and harrowed subsequently as often as surface crust or weeds rendered necessary.
- Ploughed 7in. deep and immediately harrowed.
 Cultivated before September 1st, and subsequently as often as found necessary.

Operations carried out in 1914/15.

Ploughed 7in. deep July 13, 14, rolled with Cambridge roller, July 16. Cross cultivated August 17; harrowed August 17.

August 17.
Cultivated October 9, November 18,
December 21, January 29, April 20;
harrowed, April 21.

Ploughed 7in. deep, July 14-15; harrowed, July 16-18; cultivated, August 17, October 9, November 18, December 21, January 30, April 20; harrowed April 21.

Plan of Experiment.

Early Fallows.

 Ploughed 7in. deep, and cultivated three times in course of season; harrowed at seeding.

4. Ploughed 7in. deep, cross-skim ploughed before September 1st; cultivated, and subsequently as often as necessary.

Late Fallows.

Ploughed 7in. deep after September
 Heavily rolled same day as ploughed. Cultivated not later than three weeks after rolling, and if possible after rain.
 Rolled if necessary.

Cultivated or harrowed, or both, according to condition of tilth.

 Ploughed 4in. deep after September
 Cultivated after fall of rain, and subsequently as often as necessary. Operations carried out in 1914/15.

Ploughed 7in. deep, July 16; cultivated October 9-10, December 22, April 21; harrowed April 22.

Ploughed 7in. deep July 15-20; crossskim ploughed August 18; cultivated October 12, November 19, December 21, February 2, April 22; harrowed April 23.

Ploughed 7in. deep, September 22-25; rolled with clod crusher, September 22-25; cultivated October 12 (not after rain; 8 points during preceding month).

Rolled November 2-3; cultivated November 13, November 19, December 21, February 2, April 22; harrowed April 23.

Ploughed 4in. deep, September 26-29; Cultivated November 19 (after 31 points rain); cultivated December 22, February 2, April 22; harrowed April

All the plots were sown between April 21st and 24th with 90lbs. of graded King's White Selection 6 and 2cwts. of 36/38 mineral superphosphate per acre. A turn of the light harrows completed seeding operations. The seed sown on the early fallows germinated two or three days before that drilled on the late ploughed plots, and a similar difference in the rate of development was observed at flowering time.

It was originally intended to harvest these plots for grain, but, unfortunately, patches of "whiteheads" made their appearance about the end of September, and as they appeared to be spreading, it was decided to cut the crop for hay. Accordingly the binders were set going on October 3rd, and five weeks later the crop was carted on to the weighbridge, with the following results:—

Table IX.—Containing Results Obtained from Cultivation Plots in Grainger's A., 1912-1915.

	Total Pro	oduce.		Yield.	Hay	Yield.	Mean Hay Yield.
Plot 1 Plot 2 Plot 3 Plot 4	1912. T. C. L. 1 15 103 1 17 43 1 13 100 1 17 40	1913. c. L. 16 90 14 109 13 91 14 14	1912. T. C. L. 2 3 90 2 5 66 2 1 37 2 5 62	1 0 55 6 0 18 29 7 0 16 95	1914. c. l. 18 75 16 71 17 40 17 51	1915. T. C. L. 1 18 109 1 18 22 2 2 23 2 4 106	1912/1915. T. C. L. 1 10 54 1 9 75 1 9 49 1 11 33
			out of	Mean yield	of early fa	llows	1 10 25
Plot 5 Plot 6	1 19 19 1 6 88	$\begin{array}{ccc} 12 & 7 \\ 9 & 60 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 14 80 0 11 70	19 94 12 98	2 6 109 2 2 29	1 12 36 1 4 96
				Mean yield	of late fall	ows	1 *8 66

In 1912 and 1913 the crop was cut and threshed for grain, and the total produce from each plot was weighed and recorded. Last season and also in 1914 the crop was cut for hay. In order to be able to compare the results obtained during the four-year period, it is necessary to calculate the hay yields for 1912 and 1913 from the "total produce" figures. In doing this I have made use of the factor worked out by Professor Perkins and Mr. W. J. Spafford. They deduced from their experiments that the hay yield stands in relation to the total produce yield as 100 to 82. This connecting link enables us to make a more reliable comparison of the different seasons' yields than would otherwise be possible.

Viewing the results broadly, the first point that arrests attention is the very slight difference between the mean figures for the early and late ploughed fallows. Accepting 35s. per ton as an average price for hay in this district, the gross money value of the extra yield on the early fallows—lewt, 71lbs.—works out at a shade under 3s. per acre. If we exclude for the moment Plot 6, which is ploughed only 4in. deep, and compare the mean yield from the early fallows with the late fallowed plot that is given a 7in. furrow, we find that the returns from the September ploughing are 2cwts. 11lbs. per acre better than those from the winter fallowed plots. The difference in this instance, on the same basis of computation, is worth approximately 3s. 8d. per acre. This result is contrary to all expectations, and is admittedly difficult to understand in view of the universal experience in favor of early fallowing. An examination of the results of each year does not simplify matters, for it will be observed that in three out of the four seasons Plot No. 5 has given the highest yield in the whole field. It is true that in 1913, which was a very backward season, the seeding rains being delayed till August, the early ploughing showed to advantage, but in 1914, the driest season on record, and again in 1915 on land that lay fallow during 1914, we find the September ploughed plot at the top of the list. Moreover, in 1915 we notice that even the late fallow that is ploughed 4in. deep gives a higher yield than three out of the four early fallowed plots despite the 1914 drought. The scarcity of rain during the summer of 1914 no doubt nullified to a large extent the water-conserving effect of good fallow, and thus tended to reduce them all to one level in regard to moisture content; but even so, it comes as a surprise to find the returns from the late ploughings in excess of those derived from Plots 1 to 4. In last year's harvest report I referred to the influence of a phenomenal thunderstorm (1.82in.) in February, 1914, on the fallows. The late fallows harvested this season were then stubble plots, and of course shared in the down-pour, but when we remember that the February flood was followed by practically 13 months of drought, it is hardly conceivable that this circumstance would appreciably affect the 1915 harvest. Probably the rough knobbly condition of the late fallows helped them through the wet winter of this season and checked the formation of hard crust, whereas the thoroughly worked early fallows, being finer in the tilth, tended to melt down and set hard in the dry spring. The most that can be stated in explanation, however, is that the experiments are too short-lived at present to furnish reliable data. This implies that it is considered probable that at the end of 10 or 15 years the present relative position of the plots will be changed, and that the anomalous results so far obtained will give place to others that accord more harmoniously with the generally accepted views on the question of early versus late fallowing.

On studying the table of yields more closely, it will be seen that the plot receiving the least amount of tillage (Plot 3) has given the lowest average return. Plot 2, which is treated similarly to Plot No. 3, but receives in addition a harrowing immediately after ploughing, has returned an additional 26lbs. of hay per acre per annum. This difference is so small as to be negligible, so that up to the present time the extra harrowing cannot be said to have affected the hav yield. The treatment of No. 1 Plot differs from that of No. 2 in that the ploughing is immediately rolled with a heavy roller instead of being harrowed, and it appears from the results so far available that this practice is likely to give slightly better The difference in the mean figures is very little more than returns. 2cwt., but a glance at the results of the individual years will show that the rolled plot has cut heavier than the harrowed on three out of four seasons.

Of all the early fallows the highest returns have been gained on the skim-ploughed plot. The ploughed land is allowed to be in the furrow till the spring. It is then cross-ploughed about 2½in. to 3in. deep at the beginning of spring and subsequently cultivated as often as necessary. The turning up of a fresh surface in a season as dry as 1914 evidently did more good than harm, as the plot yielded 2½cwts. per acre more than the next best of the early fallows this year. It will be interesting later on to contrast this plot with Plots 1 and 2 in order to gauge the effects of the additional work put into the fallows in July and August.

Turning to the late fallows, it will be observed that the 7in. ploughing has given consistently better yields than the shallower depth, and

the mean difference of nearly 7½cwts. per acre is important as representing an average money value of over 6s. per acre gross. The cultivation given to the 7in. ploughing in Plot 5 would be difficult to carry out on broad acres, as it involves the rolling of the ploughing with a heavy clod crusher the same day as ploughed, but it serves to bring out the fact that when late ploughing is forced upon us the furrow need not necessarily be a shallow one, provided the ploughing be well consolidated and the soil kept stirred during the summer.

I attach very great importance to these investigations into our cultural methods, and propose to extend this branch of the experimental work. It is much too early at present to dogmatise upon the merits of the systems now being tested, but for future consideration it is well to record the facts furnished by the yields obtained, and these may be briefly summarised as under:—

- 1. Late-ploughed fallows (September), when properly treated, have yielded within 1\(^4\)cwts. of hay per acre of the amount obtained on early-ploughed fallows (July).
- 2. Deeply-ploughed late fallows have yielded an average of $7\frac{1}{2}$ cwts. more hay per acre than shallow-ploughed late fallows.
- 3. Deeply-ploughed late fallow has yielded higher average returns than deeply-ploughed early fallows.
- 4. Rolled deep ploughing (early fallows) has given better average returns than harrowed deep ploughing.
- 5. Harrowed deep ploughing (early fallows) has not given appreciably higher returns than land left in the furrow through the winter.
- 6. Deep ploughing untouched in the winter but skim-ploughed in the spring has given the highest average returns of all the early fallows.

GRAINGER'S C.

Superphosphate Plots.—There are 42.30 acres in this field devoted to permanent experimental work, and of this area 14.10 acres were harvested for hay this season. The crop (King's White Selection 6) yielded an average return of 1 ton 14cwts. 42lbs. per acre. A detailed report of the experiments being conducted on this area will appear later in pamphlet form.

ISLAND A.

Prior History.—1897, fallow; 1898, wheat; 1899, pasture; 1900, fallow; 1901, wheat and oats; 1902, fallow; 1903, wheat and oats; 1904, pasture; 1905, fallow; 1906, wheat, pease, and barley; 1907, fallow; 1908, wheat and oats; 1909, rape; 1910, barley; 1911, fallow; 1912, barley; 1913, pasture; 1914, fallow.

This field is situated for the most part on a sandy rise, and although fairly well sheltered by scrub, the high winds experienced in the summer of 1914 caused the fallow to drift badly. As soon as

the first seeding rains arrived the cultivators were used to prepare a seed-bed, and, with the object of ensuring a fair return in the event of a recurrence of drought conditions, an early wheat—King's Red was sown as soon as the land was ready for drilling. The combination of circumstances, viz., early land, early wheat, early seeding, and unusually favorable growing weather, led to almost unparalleled development of straw and flag. The crop was originally intended for grain, and consequently the seeding was relatively light (72lbs, per This fact undoubtedly told against the crop later on, when it subsided in the face of strong hot N.W. winds that swept over it during the latter part of July. Up till that period the crop stood up well, and we anticipated a return of 20 to 25bush, to the acre. Having started to lean, however, the rank weak straw failed to hold against the spring rains and rough weather, and it became apparent that, unless it were bound and threshed, very considerable losses in harvesting would have to be faced. Having regard to the earliness of the crop and the distance between it and the thresher, it was decided to cut it all for hay, with the exception of a small area of the highest selection required for next season's seeding. The crop did not wholly escape rust, but I do not think the yield was materially affected by it. Some portions, where the fallow had drifted, appeared to blight off, and this, together with the light seeding, will account for the yield being under rather than over the mean return of 2 tons per acre usually obtained in the district. binders were started in September, and the hay was carted and stacked between November 27th and December 4th. The area cut was 34.208 acres, and the total weight obtained was 67 tons 19cwts. 17lbs. Yield per acre, 1 ton 19cwts. 82lbs.

King's Red Selection 8 occupied the north-western end of the field, and Selection 7 the remainder. In common with all the farm hay fields, this paddock received 2cwts. of mineral superphosphate per acre at seeding.

ISLAND B.

The previous history of this field is identical with that of Island A up to the end of 1908. Subsequently, it was treated as under:—1909, fallow; 1910, wheat; 1911, fallow; 1912, wheat; 1913, pasture; 1914, fallow.

The western half lies in a hollow, and consists of fairly heavy clay, but the eastern half is rising land of a much lighter character, merging into sand in the north-eastern corner.

The fallow was rolled at the end of September and cultivated immediately after. It received a further cultivation in the middle of January, and was scarified again in front of the drill.

Selections 6 and 7 of King's Red were sown with 2cwts. of standard superphosphate per acre between April 19th and 27th. As in the case of Island A, the seeding was light, namely 72lbs. per acre, but a splendid germination resulted, and up till late in the spring the field presented a very attractive appearance. In October, however, the low-lying portion began to lodge, and in the end this area had to be treated in the same manner as the crop in the preceding field. The rising bank carried a stronger strawed crop that stood up well until it reached the ripening stage.

It will be observed from the yields shown in Table VII. that the King's Red in this field cut over a quarter of a ton more hay per acre than in the adjoining Island A. This is readily accounted for, however, by the stronger nature of the soil in Island B, and the greater wastage that occurred through the tangled character of the lighter crop.

FLETT'S.

The earlier history of this field is as follows:—1902, fallow; 1903, wheat; 1904, fallow; 1905, wheat; 1906, pasture; 1907, fallow; 1908, wheat; 1909, pasture; 1910, fallow; 1911, wheat, barley, and oats; 1912, fallow; 1913, wheat, barley, oats, and rye; 1914, barley.

This field, which contains 175 acres of light limestony soil, grew a fine crop of straw in 1913, but the ravages of red rust ruined the grain yield. The 1914 barley crop had to be grazed off in the spring. This season it was disc cultivated and rolled in April and May, and seeding was begun on April 19th. After one day's work the drill team was called to another field, and sowing was not resumed till April 26th; eight days later seeding operations were again interrupted, dry weather on this occasion being the cause. Once or twice during the sowing season, anxiety for some of the early sown crops was felt on account of dry weather, and fields in the process of seeding at these times were hardly safe drilling, owing to the risk of grain malting. It was this danger that caused us to hold up the work in Flett's, and although no harm would have resulted had the drills been kept going, the precaution was a wise one to take, and under similar circumstances I would again refuse to run risks of this nature when the work is well in hand. 29th May the whole field had been sown to King's White Selection 6 at the rate of 2 bushels per acre, but owing to the failure of the barley crop in 1914, the usual dressing of 2cwts. of 36/38 mineral superphosphate was reduced by one half. The crop showed patches of an unhealthy color at first, but subsequently it recovered from this check and developed into a dense even crop of medium height

with a good proportion of ears to straw. Rust attacked it badly in October, but the dry weather that followed hindered its development, and, in the end, a relatively clean sample of fine strawed hay was obtained. It was very noticeable that the one or two poor patches in the field coincided in position with the areas that grew the most barley in 1914. The average yield of 2 tons 12cwts. 21lbs. per acre over an area of 168.957 acres, or an aggregate of 440 tons 17cwts. 41lbs. is eminently satisfactory, and constitutes a record for the College. That this high-water mark should have been attained on light land that had not been bare fallowed since 1912 is a striking illustration of the favorableness of the 1915 weather conditions.

FIELD No. 1.

This field of 11.460 acres has already been referred to under the heading of Ensilage Crops. It is probably the first time since these harvest reports have been compiled that a wheat crop has been cuiboth for ensilage and hay in one season. After, or, indeed, almost before the July harvest was concluded, good soaking rains fell, and the green stubble began at once to develop a strong second growth. This aftermath ultimately attained a height of at least 3ft., and as it shot into ear it seemed likely that it would yield a good crop of In October, however, red rust appeared and made such strides that it was decided to put the binders in again and cut the crop for hay. In all, nearly 22 tons was obtained from 11.46 acres, the acre yield being 1 ton 18cwts. 38lbs. This is not a high average, but bearing in mind that 5 tons 18cwts. 85lbs. per acre of wheaten ensilage was mown in the same field four months before, it is a phenomenally fine yield. It may be mentioned that the first stubble was rolled heavily immediately after the binder, in order to bruise the stools and, in the event of the crop being cut for hay, to let the knives get well down to the bottom. The hay crop was cut at the end of November, and was carted in at intervals during the month following.

PIG PADDOCK B.

The wonderful returns secured in Field No. 1 were even eclipsed by the crop grown in this little field of 3.658 acres. The treatment accorded it was identical with that given to No. 1, and the hay yield was found to be 5cwts. 91lbs. per acre better. This is the more remarkable since the traffic of the wagons when carting off the green crop in July did considerable damage to the western side of the field, and in a relatively small area, injury to a wagon width the full length of the field is bound to affect the acre-yield appreciably. Nevertheless, we cut 2 tons. 14cwts. 17lbs. of hay from this field early in December, and it will be recalled that the

July binding gave us 7 tons 6cwts. 11lbs. per acre of greenstuff. For mallee scrub land, these yields are at least encouraging.

HEADLANDS.

These comprised in all 34.292 acres, from which was obtaind 80 tons 0cwts. 90lbs. of hay, giving an average acre-yield of 2 tons 6cwts. 76lbs

THE AMOUNT OF HAY CUT PER BALL OF BINDER TWINE.

This question has received attention during the last five harvests. and it may now be regarded as an established fact that in this district the twine requirements of an average hav crop may be estimated approximately on the basis of one ball to 2 tons. The difference between the highest and lowest figures in the subjoined table amounts to 12cwt. 62lbs. This variation is a fairly wide one, but it will be remembered that the hay crops during the period 1911-1915 have been far from uniform in character. Generally speaking, the good hay seasons call for more twine relatively to poor years, although in 1913, with an average of only 16cwts. 6lbs, per acre, each ball of twine used corresponded to less than 35cwts. of hay. In seasons of rank growth, however, the ratio will usually fall below the average, and this has been our experience with all the early hay crops in 1915. The later sown areas (168 acres) in Flett's was cut at the rate of 2 tons 3cwts. 24lbs. per ball, that is 3cwts. per ball above the general average. The final figures, however, for the whole area in 1915 are 66lbs. below the average for the preceding four seasons.

Table X.—Showing Relation between Ball of Binder Twine and Amount of Hay Cut, 1911-1915.

1911	237.223 228.909 232.406	Yield Tons. 1 1 0 0 2			No. of balls. 120½ 200½ 108 85		. cwts. 6	ball. lbs. 65 54 3 17 81
Average for 1911			<u>'</u> 8	18	±0(,	2	0	22

AVERAGE HAY YIELD, 1915.

The general average hay yield for 1915—2 tons 7cwts. 23lbs. per acre—has been exceeded five times during the past 12 years. The highest average was obtained in 1905, but the area cut was only 60 acres, and I am therefore inclined to regard the year 1909, when the hay area amounted to close upon 150 acres, as being the best hay harvest the College has yet experienced. Since 1910 the College hay area has never fallen below 200 acres, and this year for the first time it exceeded 300 acres. The acre-yield, however, over an

area of 200 or more acres has never before reached 13 tons, whereas in 1915, over 341.649 acres, it is 2 tons 7cwts. 23lbs., or about 61 cwts. better than the average return for the preceding 11 years. It is gratifying to find that the heaviest hay harvest on record at the College has had the effect of raising the general average hay returns by over half a hundredweight (61lbs.) per acre.

Table XI.—Showing Average Hay Yields on the College Farm, 1904-1915.

			Rainf	all.							
		ď	'Useful.''	Total.	Area	Tota	al yiel	d.	Avera	ge y	ield.
			Inches.	Inches.	Acres.	Tons.	cwts.	lbs.	Tons.	cwt	s. lbs.
1904	١.,		. 11.60	14.70	93.000	238	()	0	2	11	22
1905	j		. 14.23	16.71	60.000	198	8	22	3	5	67
1906	3		16.31	19.73	93.000	241	0	0	2	11	90
1907	7		13.96	15.13	51.000	91	14	20	1	15	108
1908	3		15.52	17.75	112.800	293	6	23	2	7	5
1909			21.15	24.05	145.397	404	4	54	2	15	68
1910)		. 16.79	23.87	94.900	224	7	6	2	7	31
1911	ι		9.45	13.68	200,100	290	12	94	1	8	6
1912	3		. 13.05	14.97	248.450	432	7	49	1	14	90
1913	}		. 10.82	15.66	258.200	207	7	111	0	16	7
1914	£		. 6.12	9.36	247.647	181	13	107	0	14	75
191	ĭ		. 18.33	19.76	341.649	806	7	36	2	7	23
											0.1
				Avera	age for 12 y	ears	• • • •		2	1	31
				T	o be contin	nued.)					

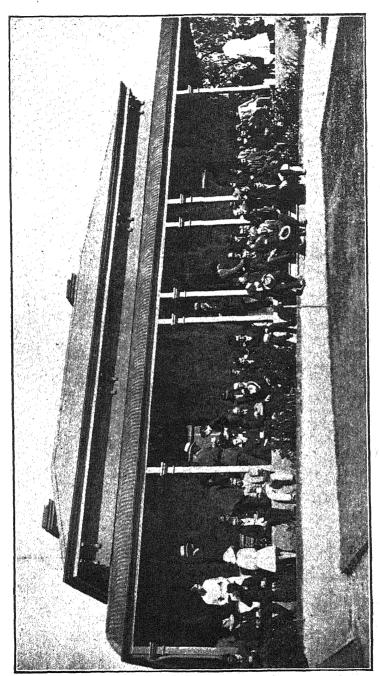
THE AGRICULTURAL BUREAU.

THE HOMESTEAD MEETING.

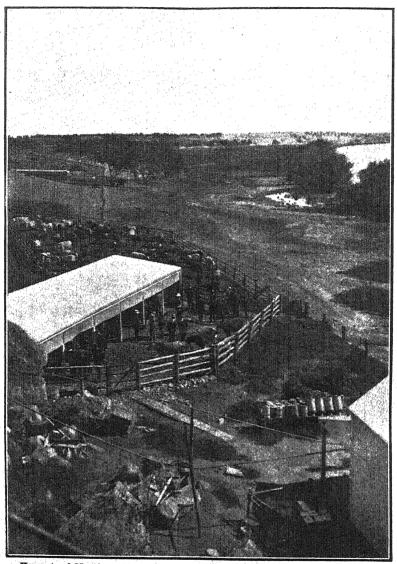
There is probably no function associated with the activities of the Agricultural Bureau that is more popular with members than the "homestead" meeting.

The nature of this varies from a visit to the farm of a particular member, where the visitors inspect and discuss items of interest that come under their notice, to the more pretentious tour of a district, embracing inspection of numerous holdings and the examination of the crops, stock, and plant generally.

A typical instance was the visit to Mypolonga by the combined Murray Bridge and Mount Barker Branches, which was made on February 26th. Fifty members of the Branches concerned, together with a number of visitors, were conveyed from Murray Bridge to Mypolonga in launches placed at their disposal by the Director of Irrigation (Mr. S. McIntosh). A general inspection of the settlement was made, and the visitors were entertained at "Glen Lossie," the residence of the Hon. J. Cowan, M.L.C.



Homestead Meeting,-Members Entertained by the Hon. J. Cowan, M.L.C,



Homestead Meeting.—Watching the Dairy Herd being Milked by Machinery.



EXPERIMENTAL FARM HARVEST REPORTS.

By W. J. Spafford, Superintendent Experimental Work.

1.—VEITCH'S WELL EXPERIMENTAL FARM.

Manager: Mr. L. Smith.

This farm is situated in the hundred of Allen, 158 miles from Adelaide, on the Loxton railway. It contains 3,800 acres of land, the bulk of which is sandy, the remainder running to shallow light loam soils overlying hard limestone rock, conditions similar to thousands of acres of surrounding country.

THE SEASON 1915.

The year opened with practically no rain—about half an inch fell in January, none in both February and March, and only half an inch in April. Normally April to May is the seeding period in this district, so naturally, with so little rain, conditions were beginning to look serious; but they were corrected by nice falls in May. In this month 1·33in. fell, making a total of 1·84in. for the "seeding" rains, whereas the average for the last seven years is 1·74in. Good winter rains (June-July) followed these, and for the two months 2·54in. as against an average for this period of 2·64in. were registered. Spring rains (August-October) to the extent of 4·22in. fell, which quantity is almost \(\frac{2}{2}in. \) above the average for these months. These spring rains, despite the fact that hardly any useful summer rains were experienced (only 0·19in.), so benefited the crops that they resulted in the record yield for the farm since any large area has been harvested. The total rainfall for the year was only 9·83in., but of this 8·79in. was "useful" rain. The following table sets out in detail the rainfall recorded at this farm since 1909:—

Rainfall Distribution at Veitch's Well, 1909-1915.

	1909.	1910.	1911.	1912.	1913.	1914.	1915.	Means, 1909-1915.
	In.	In.	In.	In.	In.	In.	In.	In.
January	0.56	0.26	0.84		0.10	0.31	0.48	0.35
February	0.19	0.32	3.17	0.29	2.67	0.56		1.01
March	0.66	4.78	0.65	0.30	3.22	1.06		1.62
April	0.15		0.03	0.18	0.14	1.01	0.51	0.28
May	3.03	2.16	1.32		1.23	0.52	1.33	1.46
Jung	2.48	2.09	0.90	3.95		0.35	1.91	1.66
July	1.73	1.41	1.11	1.09	0.53	0.38	0.63	0.98
August	2.24	0.58	0.66	1.25	0.67		1.67	1.01
September	1.78	2.34	2.13	1.33	3.22	0.15	1.99	1.84
October	0.56	0.88	0.36	0.34	1.80	0.15	0.56	0.66
November	1.07	0.69	0.77	2.05	0.68	1.10	0.19	0.93
December		0.68	1.42	0.79	0.69	0.65	0.56	0.68
Total Total "Useful"	14-45	16-19	13.36	11.57	14.95	6.24	9.83	12.53
Rain (April to November)	13.04	10.15	7.28	10-19	8-27	3.66	8.79	8-82

DISTRIBUTION OF "USEFUL" RAINFALL.

The Director of Agriculture (Professor Perkins) has frequently pointed out that the rain falling between April and November is the rain that determines what the wheat crop will be in South Australia, and as such he made a practice of grouping the rains for those months together and calling them the "Useful" rainfall. He also went further, and showed that it is the distribution of this "useful" rain that is more important than the total. This year at Veitch's Well Experimental Farm demonstrated these points very clearly, for with a "useful" rainfall of 8-79in. out of a total fall of 9-83in. a record yield of wheat was obtained, whereas the average yearly fall is 12-53in.

The rainfal was very nicely distributed, fair seeding rains, very fair winter rains, and good early spring rains, as the following table shows:—

Distribution of "Useful" Rain in 1915 comparatively with the Means from 1909-1915.

	1915.	Means from 1909 to 1915,
		In.
Seeding rains (April-May)	1.84	1.74
Winter rains (June-July)	2.54	2.64
Spring rains (August-October)	4.22	3.51
Early Summer rains (November)	0.19	0.93
Total " Useful " rain	8.79	8.82

CROPS.

The only crops attempted this year were the cereals, and all of these were sown on fallowed land, some little of which was two years' fallow, where the seed sown in 1914 did not germinate, or else on newly-cleared land. In every case the land was kept free from weeds throughout the year, and was cultivated and harrowed before seeding. Another harrowing was given to all land sown, immediately after the drill.

Hay Crops.—Field No. 3A, comprising 158 acres, was seeded to Algerian oats at the rate of 60lbs, per acre, with Icwt, superphosphate per acre on 70 acres, and the remaining 88 acres was sown to the following wheats:—King's Early, Silver Baart, and Baroota Wonder, at the rate of 60lbs, seed and Icwt, superphosphate to the acre.

From the 70 acres of oats, 70 tons of hay was stacked, and from the wheat 110 tons of hay, making a total of 180 tons of hay from 158 acres, equal to 1 ton 2cwts. 88lbs. per acre.

Hay Returns, Veitch's Well, 1910-1915.

1209 10000, 10, 7 000010	0 11 000, 1	010.10	117.					
Year.	Rainfall.	Area.	Tota	l Yio	ld.			
						700	r Ac	rc.
	In.	Acres.	r.	C.	L	T.	C.	L.
1910	16.19	82.0	82	0	()	1	0	()
1911		121.5	74	18	0	()	12	37
1912	11.57	218.0	109	0	0	0	10	0
1913	14.95	140.0	70	0	0	0	10	()
1914	6.24	100.0		-		Tota	al fai	lure
1915	9.83	158.0	180	0	0	1	2	88
Means	12.53			···········				37

Barley Crops.—Only one variety of barley was grown this year, i.e., one of the 6-rowed types. This was drilled in with 1cwt. of superphosphate to the acre, at the rate of 50lbs. seed to the acre, on fallowed land. Sown very late on a piece of land very dirty with mallee shoots, it did not make good progress at any time during its growth, and finished by yielding 248bush. 9lbs. from 22.72 acres, averaging 10bush. 46lbs. to the acre.

Wheat Crops.—In view of the almost complete failure of crops last year, and the difficulty of securing satisfactory seed wheat, a much smaller number of varieties of wheat were sown this season than has hitherto been the practice on this farm. The varieties grown yielded as follows:—

Field No. 1.—The land cropped in this field had the scrub rolled down and burnt off in 1914. It was ploughed up soon after burning, and was cultivated and harrowed before seeding. Varieties were sown at the rate of 1 bush. seed and 1 cwt. superphosphate per acre.

•	Area	'Tot	al	Yie	eld.	
Variety.	Harvested. Acres.	Yield.		per Acre.		
·	Acres.	Bush.	lbs.	Bush	. lbs.	
Federation						
Yandilla King	94.41	947	24	10	2	

Field No. 2.—The portion of this field that was under crop was bare fallowed, one part of it being two years' fallow. The seed for all varieties was sown at the rate of 60lbs. per acre, with 1cwt. superphosphate to the acre.

		Total Yield. Bush. lbs.	per A	Acre.	
Federation	14.30	157 58	11	3	
Silver Baart	18.05	176 48	9	48	
Cumberland	10.13	79 34	7	5	I
Baroota Wonder	26.52	267 22	10	5	
Silver King	81.31	754 24	9	17	
Baroota Wonder	78.16	1,063 42	13	37	

Field No. 3.—A block of about 225 acres in this field was well fallowed, and at seeding 60lbs. of wheat and 1cwt. superphosphate was drilled in to the acre on the bulk of it. The remainder carried experimental plots.

•		Total	Yield
Variety.	Area.	Yield. Bush. lbs.	per Acre.
·	Acres.	Bush. 1bs.	Bush, lbs
Yandilla King	$25 \cdot 20$	252 50	10 2
King's Early	183.65	2,484 43	13 - 32

Wheat was also grown in comparative manurial plots and rate of seeding plots, but details of these will be shown under separate headings.

The following table shows the wheat returns for this farm since 1909, and the average yield for seven years:—

Wheat Returns, Veitch's Well, 1909-1915.

Year.	Rainfall. In.		Yield.	1
1909	14.45	22.0	396 0	18 - 0
1910	16.19	197.5	2,156 0	10 55
1911	13.36	620.9	5,080 30	8 11
1912	11.57	569.0	5,544 18	9 45
1913	14.95	791.4	4,742 28	6 0
1914	6.24	951.0	325 30	0 21
1915	9.83	$602 \cdot 11$	6,681 51	11 6
Means	12.53	Mana	*****	9 11

The individual yields and the averages of the wheats that have been grown continuously since 1910 on this farm are set out in the following table:—

Yields of Varieties of Wheats, Veitch's Well, 1910-1915.

Variety.	19	10.	19	11.	19	12.	19	13.	19	14.	19	15.			s for cars.
Rainfall—	16-1	9in.	13-3	6in.	11.8	57in.	14.9	5in.	6.2	4in.	9.8	3in.		_	
Baroota Wonder .	в. 24	L. 0	в.	L. 55	B. 8	1 29	B. 8	L. 27	в.	L. 18	в. 12	L. 43		в.	L. 29
Yandilla King	21	Õ	6	0	9	14	9	6	,	lure	10	2	1	9	14
King's Early Cumberland	15 14	$\frac{0}{27}$	7 9	$\frac{5}{23}$	9 11	$\frac{38}{5}$	4 6	$\frac{26}{15}$	Fai 0	lure 7	13 7	$\frac{26}{51}$		8	16 11
Federation Silver Baart	16 9	$\frac{41}{30}$	8	16 9	10	53 8	5 6	48 41	0	$\frac{1}{19}$	6	48 48		8	4 6
Farm average	10	55	8	11	9	45	6	0	0	21	11	6		9	11

EXPERIMENTAL PLOTS.

For a number of years since the commencement of operations on the farm various manurial and rate of seeding tests have been carried out, but the quantities of manures and seed used have varied with the individual seasons, so that the averages cannot be tabulated.

The plots put in this year are as follows:-

Quantitative Fertiliser Tests, Veitch's Well, 1915.

Superphosphate (36/38) on King's Early wheat, 60lbs. seed per acre.

Plot. Fertiliser per Acre.	Area. Acres.	Total Yield, Bush. lbs.	Yield per Acre. Bush. lbs.
No manure betw. superphosphate cwt. superphosphate cwts. superphosphate cwts. superphosphate	1.97 1.97 1.97	23 23 26 6 27 1 26 55 26 15	11 52 13 15 13 43 13 40 13 19

Quantitative Seed Tests, Veitch's Well, 1915.

King's Early Wheat with 1cwt. Superphosphate per acre.

					Y_{ie}	
Plot.	Seed per Acre.	Area.	Yie	eld.	per A	Acre.
	*	Area. Acres.	Bush	. lbs.	Bush	. Ibs.
1	30lbs. wheat	1.19	11	38	9	47
2	45lbs. wheat	1.19	12	5	10	9
3	60lbs. wheat	1.19	12	48	10	45
4	80lbs. wheat	1.19	11	50	9	57

HIDE, SKIN, AND WOOL DEALERS ACT, 1915.

The regulations and the proclamation under the Hide, Skin, and Wool Dealers Act, which appeared in the Government Gazette of February 10th, provide that all hide, skin, and wool dealers must hold a licence to buy and sell. The licence remains in force for one year only, and the licensee, if he wishes to have it renewed, must apply on the form of application obtainable at the Stock and Brands Department, 14 days before the date of expiration stated on the licence he nolds. The licensing authority is the Chief Inspector of Stock, who may issue, renew, and transfer licences. The Chief Inspector of Stock has the power to refuse to issue a licence, and his decision is final.

Any person holding a licence must keep posted on all premises and vehicles used by him in his business, his name, licence number, and the words, "Licensed Hide, Skin, and Wool Dealer." Police officers and inspectors of stock are given power to enter and search premises where hides, skins, or wool are stored, and to stop and search vehicles. No licence is required for any butcher, stockowner, or farmer, who sells only hides, skins, and wool taken from animals which are his own property, but the onus to prove that he comes within this exception is on the person concerned.

No licence is required for the sale of any hide, skin, or wool, if it is to be used by the buyer in his business or domestic purposes, or for instruction (i.e., wool-classing) in connection with an educational institution.

Licensed persons may buy from unlicensed persons, but, with the exceptions already stated, they may sell only to licensees.

A penalty is provided for a person pretending to be a licensee. Every person guilty of an offence against the Act is liable to a penalty not exceeding £50 or to be imprisoned with or without hard labor for any period not exceeding 12 months.

ADVISORY BOARD OF AGRICULTURE.

The monthy meeting of the Advisory Board of Agriculture was held on Wednesday, March 8th, there being present Mr. F. Coleman (in the chair), Professor Perkins, Messrs. C. E. Birks, C. J. Tuckwell, A. M. Dawkins, J. Miller, T. H. Williams, and H. J. Finnis (acting secretary.

Cornsacks.

The Port Broughton Branch intimated that it had carried a motion to the following effect:—"That if the Government market the wheat again next year we recommend that steps be taken to obtain an adequate supply of cornsacks for same." After considerable discussion it was resolved, on the motion of Mr. Tuckwell—"That in view of the scarcity of freight, immediate arrangements should be made to secure cornsacks for the next harvest. If the Government does not intend to arrange for cornsacks, the Board suggests that such intention may be notified immediately, so that the merchants may take the matter in hand without delay.

THE BUREAU AND POLITICS.

The Hartley Branch desired to know whether, as a Branch, it could become associated with the Farmers and Settlers' Association. The Board concluded that this organization was of a more or less political character, and that, therefore, under the constitution of the Agricultural Bureau, the Branch could not do so.

Conferences.

It was decided that in future the Board would not sanction the holding of any Conference of Branches unless at least one-half of the programme was provided by members of the Branches representing the district concerned.

LIFE MEMBERS.

The following names were added to the list of life members of the Bureau:—Mr. W. Johns, of the Foster Branch; Mr. W. J. Venning, of the Crystal Brook Branch.

NEW MEMBERS.

The following names were approved as additions to the rolls of the undermentioned Branches:—Clare—F. Seidel, G. Patullo, G. Patullo, jun., C. Walden, P. Ward; Leighton—O. J. Lynch, J. E. Hogan, F. Horsell; Hartley—H. Wirth; Mount Compass—A. H. Simons; Myponga—O. Rogers; Naracoorte—E. S. Alcock, C. E. Limbert; Yaninee—L. G. Noble; Koppio—V. W. Gardener; Bute—M. R. Hall, H. J. Skelton, D. McCormack; Kalangadoo—H. Mills; Berri—W. S. Padman, R. W. Ridley, C. S. Illman; Rosy Pine—A. W. Burfatt; Lameroo—Gordon Piggott; Crystal Brook—J. Gale, A. H. Peake; Moonta—R. E. Jago, Wm. A. Edge; Mount Gambier—F. Thomas, W. Aslin; Penola—W. A. Clifford, H. G. Strong; Port Broughton—J. D. McMahon; Wirrabara—T. A. Stead; Sherlock—J. Edwards; Wepowie—Wm. M. Irvine; Milang—Ern. Alison, J. B. Harrison, W. J. Hedger, John Whiteley; Rosenthal—E. Hender, J. C. Kleinig, J. Georg, W. Heinjus.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on April 1st:-

BUTTER.—Supplies of both cream and butter continue to show a seasonable shrinkage, and heavy quantities of imported bulk are coming along to fill up the shortage. Slight fluctuations occurred during the month, "Alfa" now selling at 1s. 6d.; "Primus," 1s. 5d.; choice separators and dairies, 1s. 3d. to 1s. 4d.; store and collectors, 11d. to 1s. per lb.

EGGS.—Quantities have kept up wonderfully well for the time of year, and demand has been very brisk, any surplus being readily taken up for export. Present quotations:—Hen, 1s. 4½d.; duck, 1s. 5½d. per dozen.

Cheese.—Rates have had to come back, owing to large quantities offering in the eastern States, as, owing to the restrictions on export of butter, the factories are putting more into this commodity. Values are now from 9d. to 9½d. per lb. for large to loaf.

Bacon.—Many curers anticipated an easing in the live market, but same has not been realized, no doubt the high price of other meat causing bacon values to well maintain. Best factory-cured sides are selling at 1s. 2d. to 1s. 3d. per lb.; hams, 1s. 3d. to 1s. 5d. per lb.

HONEY.—Although increasing quantities are arriving, local demand absorbs all, so that any export orders cannot be entertained. Prime clear extracted is 5½d. to 5½d. per lb.; second grades, 4½d. to 5d.; beeswax, 1s. 4d. to 1s. 5d. per lb.

ALMONDS.—The exceptionally dry weather of the last few months has interfered with the crop of almonds, and supplies now are very short of trade wants. Brandis, 8d. to 8½d.; mixed shoftshells, 7d. to 7½d.; hardshells, 3d.; kernels, 1s. 4½d. per lb.

LIVE POULTRY.—It is pleasing to report that heavy quantities continue to come forward, but the keen demand readily clears all offering, and as buyers are now operating in anticipation of Easter trade, good prices are likely to rule for some time to come. Heavyweight table roosters fetched 4s. 3d. to 4s. 9d. each; nice-conditioned cockerels, 3s. to 3s. 6d.; plump hens, 2s. 6d. to 3s. 6d.; small and light hens, 2s. to 2s. 3d.; light cockerels, 1s. 6d. to 2s.; ducks, 2s. 6d. to 4s.; geese, 4s. 6d. to 5s.; pigeons, 7d. to 8d.; turkeys, from 11d. to 1s. 3d. per lb. live weight for fair to prime table birds.

POTATOES AND ONIONS.—Improved supplies from Tasmania and Victoria, supported by much better offerings from the Millicent district, have combined to bring about a much easier position in the potato market. It is expected that digging in the Ballarat district will commence during the next few weeks, and as the crops there promise to yield well, it is hardly likely that there will be any recurrence in the immediate future of the extremely high prices which have hitherto prevailed. ONIONS.—Local supplies have not been equal to demand, and fair quantities have been railed from the Gambier district and Victoria. Quotatious—Potatoes, £10 per ton of 2240lbs. on trucks Mile End or Port Adelaide; onions, £5 to £5 10s. per ton of 2240lbs. on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of March, 1916, also the average precipitation to the end of March, and the average annual rainfall.

Property and the second									
	For	To end	Av'ge.	Av'ge.	Mention	For	To end	Av'ge.	Av'ge.
Station.	Mar., 1916.	Mar., 1916.	to end Mar.	Annual Rainfall	Station.	Mar., 1916.	Mar., 1916.	to end Mar.	Annual Rainfell
	1910.	1010.				1010.	1010.	17,1,001.	Italii1911
77 27	300	, 		'	_ '		,	,	
Far North	AND U				Lower		-contin	ued.	
Oodnadatta	1-69	2.49	1.83	4.76	Spalding	0.35	1.17	2.36	20.25
Tarcoola		*****	1.35	7.58	Gulnare	0.25	1.16	2.12	19.74
Hergott	0.34	0.39	1.47	6.04	BundaleerW.Wks.	0.36	1.62	2.02	17.29
Farina	()·34	0.54	1.78	6.70	Yacka	0.30	0.89	1.77	15.27
Leigh's Creek	0.26	0.26	1.96	8.66	Koolunga	0.31	1.61	1.99	15.94
Beltana	0.16	0.56	2.28	9.22	Snowtown	0.68	1.09	1.85	15.70
Blinman	0.18	0.34	2.77	12.83	Brinkworth	0.44	1.22	1.94	15.48
Hookina	0.10	0.52			Blyth	0.62	2.11	2.01	16.34
Hawker	0.07	0.21	1.65	12.22	Clare	0.48	1.75	2.77	24.30
Wilson	April 100 a		1.83	11.78	Mintaro Central .	0.40	1.29	2.29	21.99
Gordon	0.06	0.24	1.79	10.26	Watervale	0.62	1.36	2.81	27.17
Quorn	0.13	0.15	1.70	13.78	Auburn	0.60	1.51	3.02	24.25
Port Augusta	0.05	0.75	1.75	9.46	Hoyleton	0.53	1.46	2.19	
Port Augusta W.	0.03	0.68	1.45	9.36	Balaklava	0.64	1.38	2.02	16.03
Bruce		0.08	1.71	10.01	Port Wakefield	0.86	1.19	2.16	
Hammond		0.15	1.82	11.46	Terowie	0.08	0.76	2.10	13.71
Wilmington	0.05	0.46	2.16	18.26	Yarcowie		1.55	2.06	13.91
Willowie		0.11	1.90	11.90	Hallett	0.13	0.73	1.97	16.40
Melrose	0-13	0.44	3.20	23.04	Mount Bryan	0.19	1.17	1.92	15.73
Booleroo Centre	0.08	0.18	1.99	15.83	Burra	0.38	1.25	2.39	17.82
Port Germein	0.22	0.41	1.82	12-84	Farrell's Flat	0.35	0.96	2.26	18.87
Wirrabara	0-16	0.61	2.24	18-91					
Appila	0.09	0.20	2.24	15-08	West of	e Mur	ray Ra	ANGE.	
Cradock	0-05	0.05	1.77	10-86	Manoora	0.45	1.18	2.17	18.09
Carrieton	0.09	0.42	1.78	12.22	Saddleworth	0.35	1.01	2.52	19.69
Johnburg	0.07	0.46	1.49	10.21	Marrabel	0.42	1.08	2.14	18 94
Eurelia		0.68	1.90	13.24	Riverton	0.50	3.11	2.47	
Orroroo		1.19	2.27	13-42	Tarlee	0.50	1.69	2.23	17.48
Black Rock	0.03	1.04	1.99	12-25	Stockport	0.64	2.63	2.07	15.89
Petersburg	0.05	0.87	2.04	13.07	Hamley Bridge	0.67	2.09	2.19	16.45
Yongala	0-16	0.48	1.87	13.94	Kapunda	0.52	1.91	2.53	19.67
7	Говтн-Т	T.AST			Freeling	0.63	1.84	2.23	17.85
Ucolta	0-02	0.71		1	Greenock	0.65	2.49	2.37	21.46
Nackara	0-14	0.77			Truro	0.49	1.29		19.74
Yunta	0.14	0.11	1.72	8.22	Stockwell	0.49	1.63	2.23	20.30
Waukaringa		0.06			Nuriootpa	0.55	1.84	2.34	
Mannahill		0.31	1.75		Angaston	0.56			
Cockburn		0.04	l .		Tanunda				
Broken Hill, NSW	0.14			1	Lyndoch	0.58	1.67	2.25	23.01
		1 0	!	1 0 20					
	WER N	ORTH.			ADE	LAIDE	PLAINS		
Port Pirie	0.24	0.39	1.86	13.21	Mallala	0.81	1.45	2.11	16.88
Port Broughton .	0.47	0.86	1.85	14-33	Roseworthy	0.69	1.29	2.14	17.31
Bute	0.60	0.85	1.79	15.42	Gawler	0.80	2.38	2.36	19.21
Laura	0.34				Two Wells		1.76		
Caltowie					Virginia	0.41	1.19		
Jamestown					Smithfield	0.34			
Gladstone					Salisbury				
Crystal Brook	0.32				North Adelaide				
Georgetown					Adelaide				
Narridy					Brighton	0.42			
Redhill	0.56	0.99	2.90	16-79	Glenelg	0.43	1.11	2.20	18.35
	1		1		1				

RAINFALL-continued.

and the same of the same of the same of the same of			NA.	INFAL	u-continued.							
Station.	For Mar., 1916.	To end Mar., 1916.	Av'ge, to end Mar.	Av'ge. Annual Rainfall	Station.	For Mar., 1916.	To end Mar., 1916.	Av'ge. to end Mar.	Av'ge. Annual Rainfall			
Adelaide	Prim	aeonf	imarad		Wilding of Sprangers Community							
					West of Spencer's Gulf-continued.							
Magill	0.39	1.65	2.85	25.69	Streaky Bay	0.36	0.63	1.54	15.31			
Glen Osmond	0.53	2.02	2.63	25.26	Port Elliston	0.34	1.27	1.39	16.49			
Mitcham	0.37	1.13	2.42	23.47	Port Lincoln	0.33	0.51	2.06	19-88			
Belair	0.40	1.17	3.00	28.64	Tumby	0.35	0.60	1.50	15.00			
3.6	Ŧ				Carrow	0.37	0.50	-				
Mount	LOFT	RANG	es.		Cowell	0.34	0.45	1.75	11.76			
Teatree Gully	0.51	1.89	3.23	28.19	Point Lowly	0.14	0.82	2 01	12.21			
Stirling West	0.47	2.00	4.46	46.70								
Uraidla	0.47	2.03	4.44	44.35	VORKI	n'a Pre	NINSUL					
Clarendon	0.42	1.59	3.52	33.67	Į.		MAIN G O EL	٠.				
Morphett Vale	0.60	1.48	2.66	23.32	Wallaroo	0.91	1.35	1.83	14-05			
Noarlunga	0.45	1.00	2.26	20.28	Kadina	0.62	0.98	1.84	15.88			
Willunga	0.46	1.28	2.74	25.98	Moonta	0.74	0.99	1.84	15.22			
Aldinga	0.37	0.99	2.36	20.34	Green's Plains	0.73	0.97	1.69	15.73			
Normanville	0.39	0.96	2.13	20.65	Maitland	0.51	0.77	2.04	20.08			
Yankalilla	0.40	1.21	2.50	22.78	Ardrossan	0.44	0.74	1.65	13.89			
Cape Jervis	0.30	0.64	1.62	16.34	Port Victoria	0.23	0.51	1.60	15.20			
Mount Pleasant .	0.60	2.37	2.70	26.87	Curramulka	0.14	0.34	2.02	18.51			
Blumberg	0.56	1.48	3.00	29.38	Minlaton	0.24	0.50	1.75	17.41			
Gumeracha	0.52	2.07	3.21	33.30	Stansbury	0.30	0.63	1.86	17.06			
Lobethal	0.37	1.37	3.13	35.38	Warooka	0.37	0.61	1'59	17.71			
Woodside	0.39	1.56	3.08	31.87	Yorketown	0.29	0.41	1.66	17.47			
Hahndorf	0.41	1.64	3.35	35.45	Edithburgh	0.34	0.77	1.87	16.48			
Nairne	0.37	1.23	3.33	28.83	_	_						
Mount Barker	0.50	1.85	3.31	30.93	South	AND SC	TH-E	ist.				
Echunga	0.47	1.44	3.42	32.83	Cape Borda	0.46	0.92	2.19	25.09			
Macclesfield	0.55	1.47	3.15	30.72	Kingscote	0.47	0.90	1.77	18.95			
Meadows	0.65	1.60	3.74	35.52	Penneshaw	0.63	1.37	2.23	21.34			
Strathalbyn	0.47	1.19	2.48	19.28	Cape Willoughby.	0.52	2.91	2.16	19-69			
					Victor Harbor	0.47	1.10	2.56	22.18			
Murray	FLATS	and Va	LLEY.		Port Elliot	0.37	0.90	2.45	20.33			
Wellington	0.34	0.77	2.24	15.01	Goolwa	0.45	1.64	2.33	17.93			
Milang	0.30	0.85	2.12	16.08	Pinnaroo	0.23	0.93	2.59	16.74			
Langhorne's Brdg	0.31	0.62	2.07	15.27	Parilla	0.35	1.41					
Tailem Bend	0.25	0.49			Lameroo	0.32	1.33	2.09	16.55			
Murray Bridge	0.25	0.76	2.15	14.32	Parrakie		0.45	-				
Callington	0.23	0.76	2.22	15.65	Geranium		0.67					
Mannum	0.66	0.93	1.86	11.67	Peake		0.59					
Palmer	0.48	1.03	2.23	15.60	Cooke's Plains	0.19	0.63	2.06	14.74			
Sedan	0.56	1.05	1.62	11.92	Meningie	0.26	0.78	2.20	18.87			
Blanchetown	0.30	0.73	1.94	10.71	Coonalpyn	0.07	0.74	2.07	17.49			
Eudunda	0.30	0.97	2.16	17.33	Coomandook	0.12	0.91	0.71	16.80			
Sutherlands	0.30	1.20	1.40	10.60	Tintinarra	0.11	0.74	2.31	18.78			
Morgan	0.18	0.54	1.51	9.29	Keith	0.09	0.66	_				
Overland Corner .	0.11	0.20	2.02	11-42	Bordertown		1.67	2.17	19.76			
Renmark	0:08	0.43	1.81	10.93	Wolseley	0.03	1.97	1.86	17.72			
Loxton	0.28	0.61			Frances	0.02	1.60	2.32	20.74			
				f)	Naracoorte	0.09	1.64	2.56	22.60			
WEST OF	Spano	mp's Ci	W. 777	Į.	Penola	0.13	2.30	3.24	26.78			
				70.75	Lucindale	0.14	1.75	2.46	23.32			
Eucla	0.05	1.03	2.16	10.13	Kingston	0.12	1.67	2.45	24.73			
White Well	0.44	1.47	1.58	9-67	Robe	0.30	2.61	2.53	24.69			
Fowler's Bay	0.10	0.43	1.32	12-11	Beachport	0.20	1.14	3.02	27.51			
Penong	0.05	0.62	1.39	11.93	Millicent	0.28	2.82	3.31	29.25			
Murat Bay	0·10 0·15	0.32		- 4	Mount Gambier .	0.35	2.93	4.04	32.00			
Smoky Bay	0.19	0.27		_	C. Nrthumberland	0.27	2.62	3.02	26.63			

THE AGRICULTURAL BUREAU.

CONFERENCE OF LOWER NORTHERN BRANCHES.

The Annual Conference of the Lower Northern Branches of the Agricultural Bureau was held at Gawler on Friday, March 10th, 1916. The Department was represented by the Director of Agriculture (Professor A. J. Perkins), the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc., M.R.C.V.S.), the Horticultural Instructor (Mr. G. Quinn), Mr. F. E. Place, B.V.Sc., M.R.C.V.S. (Veterinary Lecturer), the Dairy Expert (Mr. P. H. Suter), Mr. W. J. Spafford (Superintendent of Experimental Work), Mr. H. E. Laffer (Viticultural Instructor), and Mr. F. Coleman (chairman), Messrs. J. Miller and G. Jeffrey (members), and Mr. H. J. Finnis (Acting Secretary of the Advisory Board of Agriculture). The following gentlemen represented the undermentioned Branches:— Angaston-W. Patching; Blyth-A. L. McEwin; Gawler River-A. J. Davis, F. W. Roediger, A. W. Roediger, F. H. Bray, A. J. Bray, W. J. Dawkins, J. H. Dawkins, B. F. Hillier, W. Rice; Lyndoch— G. W. Warren, J. Mitchell, F. Moore, J. S. Hammatt; Riverton-Hon. W. Hannaford, M.L.C., R. H. Cooper, H. C. Mills, L. Jenkins, A. Hannaford, E. A. Gray; Northfield—W. J. Dall; Rosenthal—G. H. Stevens, F. H. Wolf, H. F. Muegge, E. Hender, S. C. Gursansky; G. C. Heinjus; Saddleworth-W. H. Ashton, T. H. Eckermann; Two Wells-L. H. Dawkins, H. W. Kenner.

Mr. A. M. Dawkins (member of the Advisory Board and Chairman of the Gawler River Branch), who occupied the chair, extended a welcome to the delegates and visitors, and asked Mr. F. Coleman (Chairman of the Advisory Board) to declare the Conference open.

OPENING ADDRESS.

Mr. Coleman, in acceding, referred to the excellent class of country represented by the Conference, and mentioned the possibility in much of the district of developing the practice of irrigation to a greater extent for the growing of crops and fruit. He said there was a tendency among farmers in the older settled districts to ignore the educational value of the Agricultural Bureau, which was to be regretted, and he urged that greater enthusiasm should be evidenced in the institution. He had much pleasure in declaring the Conference open, and expressed the hope that the proceedings of the Conference would prove of distinct value to those present,

Professor A. J. Perkins (Director of Agriculture) delivered an address on "Rotation of Crops." This will be published in a subsequent issue. In discussing the subject, Mr. A. L. McEwin (Blyth) related his experience of mixed farming in earlier years, and referred to the difference in conditions at the present time which would have to be taken into consideration in planning the operations of a farm.

Mr. W. J. Dawkins (Gawler River) did not think that the growing of fodder crops on fallow land would prove to the monetary advantage of farmers in his locality, as the rainfall there was not very heavy, and the practice would tend to exhaust the available moisture in the soil. He suggested sowing rape on the stubble after wheat; and the failure of such a crop would not be of serious moment.

The Hon. W. Hannaford, M.L.C. (Riverton), said that one of the greatest difficulties with which they had to contend was the prevalence of noxious weeds, and the probable solution of this difficulty would be an increase in the number of stock carried on the farm, which would involve alteration in the practice adopted at present.

In answer to questions, Professor Perkins said that the time during which lucerne could be profitably grown without replanting depended on whether it was cut or grazed; in the former case, the maximum cuts would be secured between the sixth and tenth years after sowing; if grazing were practised, however, even with a good stand, the ground should be broken up in the third year. Silver beet was not likely to be successful in districts where the summer rainfall was scanty.

Mr. J. Miller (member of the Advisory Board) closed the morning session with a reference to the benefits resulting from the discussion following on papers contributed by practical farmers, and hoped that, at future conferences, more of such papers would be forthcoming.

Afternoon Session.

STOPPAGE IN CATTLE AND SHEEP.

In an address on this subject Mr. F. E. Place, B.V.Sc., M.R.C.V.S., said that stoppage in cattle and sheep, sometimes spoken of as "dry bible," was a condition which resulted from failure of muscular Digestion in that class of stock was a process of severe action. Stoppage was the result of and prolonged muscular action. that had commenced in another of the part All muscular action was impelled by the nerves. If the impulse from the nerves to the muscles of the digestive organs was poor the muscles responded poorly. A healthy constitution implied a healthy muscle growth, and vice versa, a healthy muscle growth was essential to the functions of a healthy constitu-

In the early symptoms of "dry bible" disorganisation of the tion. muscular system was apparent. Numerous parasites inhabited the muscular fibres, which they poisoned; these brought about the stiffness which was so marked in the early stages of the disease. increase of their poisonous action implicated more and more of the system, until the "bible" gave out. When the beast was down, with head to flank, tongue poked out, and eyes drawn in, violent purgatives were of little use. Prevention was of far more importance than treatment, and consisted in toning up the muscles of the digestive In the earlier stages, nerve tonics such as nux vomica or strychnine gave satisfactory results. Lack of phosphates in the constitution was one of the main causes of poor nervous and muscular action, and in many districts phosphates were lacking both in fodder A useful lick that went to meet these and in the soil generally. deficiencies was one of four parts of sweet bone meal and one part of saltpetre, and where the trouble was likely to be common, the use of this lick was to be advised. In reply to questions put to him, Mr. Place said that certain plants, eaten by stock which were in good condition, caused no trouble, but under certain circumstances, stock in poor condition would suffer severely from eating the same plants.

Numerous cases of death in ewes, especially those with twins, were not due so much to poisoning as to the heavier stress on the circulation and the demand made on the constitution which the ewe was unable to meet.

THE MANAGEMENT OF FARM SHEEP.

The Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc., M.R.C.V.S.) delivered an address on this subject, which will appear in a later issue.

DISCUSSION.

- Mr. G. Jeffrey (member of the Advisory Board of Agriculture) said that present conditions made it practically essential for the farmer to breed his own ewes. The farmer who did this in a systematic manner should secure more even and satisfactory results. The keeping of sheep had an important bearing on the growing of fodder crops.
- Mr. A. L. McEwin (Blyth) expressed the opinion that sheep should be more generally kept on the farm, even to the extent of handfeeding at certain periods of the year. In this connection oats were a valuable feed, and they could be stored with advantage to be fed to stock at a time when natural feed was scarce.

"A LITTLE HORSE TALK."

Mr. G. W. Warren (Lyndoch) read a paper with this title. referred to the very heavy demand for horses which existed at the present time. Was it unreasonable to suggest, he asked, that a market might be found for Australian horseflesh after the war? more profitable and humane to weed out those animals which had performed strenuous duties between the ages of 5 and 12 years, and sell them when their meat was prime than to run patient old slaves into the market to be purchased and illtreated by a jobber or unscrupulous owner. The present, therefore, seemed a most opportune time to consider the question of the improvement of the class of horse kept. In dealing with this subject, the paper continued—"Nothing will convince me that the average farmer, myself included, is careful enough in the selection of the mares used at stud. We have obtained excellent results by the examination of stallions; why not include the Veterinary science declares that certain examination of mares? unsoundnesses are hereditary; whether so or not, who can gainsay that it is preferable to breed from a mare free from these defects. is evident we must look more to the mare for like characteristics in the foal than to the stallion. It was always thought that to get a good buggy sort a blood horse crossed with a heavyish carty mare would give the best results. My experience suggests that a good, roomy light thoroughbred headed mare crossed with an active Clydesdale is preferable, although failures occur in either instance.

The mare should be worked in the earlier stages of pregnancy, provided she is not suckling a foal; in the case of farm work, the harder in reason the better. Ordinary farm work after weaning the foal should in every case be practised right up to the time of next foaling. A mare should never be allowed to get even fat. Keep her in healthy condition; she will drop a bigger and a healthier foal. If she is rolling fat, look out for trouble, especially in big draught stock. It is a cruel shame that stallions, especially draughts, are kept, as many of them are, cooped up in a loosebox sometimes without an exercise yard. High feeding, more particularly without exercise, is the cause of many ills. We meet cases of founder almost every day. Is this fat to hide blemishes, such as poor middle pieces, etc.? The stallion should be made to work every day during the off season.

THE FOAL.

On my holding the mares are kept handy during the foaling season, and as soon as a foal is dropped it is caught and encouraged to struggle; this being done frequently during the foal period, sensitive ones receiving more attention, the legs being picked up, rubbed where

Even if the foal only receives this they show signs of ticklishness. tuition once it never forgets it. It can be overdone, and the foal will get cunning; but treated rationally, it develops confidence, and once the foal gets to know it is not going to be injured Foals are dropped as early it is more than half broken in. according spring weaned. as possible. and autumn. Each is provided with halter. and all are housed together in a roomy loosebox, taught to tie up and to lead. A patch of lucerne is valuable for the mares in summer, but, in my opinion, there is no feed like our natural green winter feed for an animal and young. After the foals become fairly tractable, they are turned out by day and fed at night during their first winter; then turned out to mature. The colts are gelded after the second winter, when the feed is good and before the appearance of the blowfly.

Breaking to saddle, harness, or farm work when they are two off after the foal tuition is child's play. A little lunging, tieing back of heads, and affixing double harness, breeching strapped tightly to the light sorts and giving them a good scamper, unmolested, in a big paddock in the initial stages, letting them have a kick or two without hurting themselves is almost a guarantee that they will refrain from kicking if anything happens to go wrong in harness in after years; driving them unhitched, with long reins, both singly or with another horse, changing frequently from the off to the near side, teaching them to get into a collar by hauling a log, etc. A highly excited horse backs naturally, generally into trouble, if he is not thoroughly taught to move forward. Before driving the animal, hitch it shortly to a stout fence, coupled with another quiet reliable horse, for an hour or two at least, before asking them to start the vehicle. All work should be done in open winkers. Drive them thus for the first week or two very easy distances. When first passing a car or a cycle care should be taken. A fright is not readily forgotten. Extra care and attention in the first stages are repaid a thousandfold. Horses should be treated with firmness, taught their names, and made to do what they There is great virtue in the whip, more particularly if horses are not handled until they have matured. In a plough, wagon, buggy, or saddle, a horse should always be driven up to the bit. A puller sees a long journey out best. The first place a horse tires is in his head; therefore, hold him together with a tight rein.

In breaking for ordinary farm work it is inadvisable to couple them in big teams of, say, six or more abreast. Put the subject in between two other horses with good mouths, and teach him to answer the ordi-

nary commands. Keeping the shoulders washed immediately after use and not allowing the sweat to dry is a sure preventive of sore Stables should be roomy, with plenty of light and ventilation. I find that fixing the animals in pairs in a loosebox is preferable to having them tied singly. They should always be made to empty their mangers; a horse does better on just enough than when being over-fed. A little linseed oil fed three or four times a week in the oat ration in the absence of some green picking is valuable; use it very frequently as a drench. Do not hesitate to allow a horse to drink when thirsty, whether in a heated condition or not, provided the water is at the same temperature as the air. A great risk is run if he is allowed a feed on dry fodder in a heated condition and then allowed to drink. Hosing a heated horse in summer or winter before stabling is an admirable plan. The heat of the body will effectually dry any excess of moisture; and this tends to make him comfortable. A horse appreciates a hose when used to it.

In discussing the best means to improve our horses generally, nothing appeals more to my mind than co-operation, firstly in mare selection, rational and humane treatment to sire and dam, judicial mating to produce constitution, freedom from unsoundnesses, reasonable action, Breeding clubs should be formed, the State and a uniform type. divided into districts, and a type fixed for each district. Each member of the club could bring his mares for inspection annually, and the mares could then be classified as to stamp and bearing, and by mutual arrangement a stallion could be chosen to cover as many as possible of an even type. In following years the offspring could also be examined. After the second or third foal at most the value of the sire and dam would be proven. If a mare did not throw up to the standard she could be culled or mated with another stallion. arrangement would probably curtail the service rounds of the stallion; mares could be more readily brought to him, in lieu of him going to them. If a club were formed, no doubt the Government would be prepared to assist the movement, and if the clubs owned the stallions, and billeted them among selected members it would, no doubt, be beneficial all round. A stallion of merit could be changed with kindred clubs if a change of blood were desirable. As it is now in this district hardly two neighbors use the same stallion. The advantage of this scheme would be a better chance to produce a uniform type, and if the clubs could put on the market 50 to 100 head annually no doubt it would encourage a lot of business.

Where a type which is now fixed, as an example, the Clydesdale or Shire, was decided upon, the best of the mares could be reserved

for the stud, and kept in the district by co-operative barter or exchange. Difficulties would arise, say, where the gunner stamp was in requisition, which in my opinion could not be overcome unless a new breed were fixed. Never before in the history of our State was there a more opportune time to put horsebreeding on a better basis. The Agricultural Societies encourage fashion rather than utility. A draught stallion shown in a dray with 30cwts, behind him would enhance his value as a sire—who can gainsay? Stallions of other types should also be shown in harness. Take our other utility horses, hacks and buggy types, how the high knee action of the hackney type predominates over the long striding, easy action, nice headed types of a decade ago. These are no good to a man on the land, particularly if he does his own shoeing.

Anyone who is not practically a professional is debarred from exhibiting even at country shows, as so much polish is required to enable a horse to be even examined. Classes in which an everyday farmer could exhibit would tend to encourage the objects of Agricultural Societies, which is, I take it, to encourage all round the breeding of a better class of horse.

DISCUSSION.

- Mr. P. H. Suter (Dairy Expert) said that if farmers took up the practice of "community breeding," not only in relation to horses, but to stock generally, good results would undoubtedly accrue.
- Mr. J. H. Dawkins expressed the opinion that owners of horses competing at agricultural shows should be compelled to produce certificates of fitness for the dams of the respective horses.

In reply to a question regarding stud books, Mr. Colebatch said that the only method of establishing reliable stud books was for the Government to undertake their compilation.

NEXT CONFERENCE.

On the motion of the Hon. W. Hannaford, M.L.C. (Riverton), seconded by Mr. W. Patching (Angaston) and supported by Mr. J. S. Hammat (Lyndoch) the locus of the 1917 Conference was left to the Advisory Board of Agriculture to decide upon.

Evening Session.

THE ORANGE.

Mr. G. Quinn (Horticultural Instructor) delivered an address on this subject, the report of which will appear in a subsequent issue.

FEEDING OF DAIRY COWS.

The Government Dairy Expert (Mr. P. H. Suter) also spoke. He said that in the early ages the cow secreted only sufficient milk to rear her young. This animal had now given place to a cow which was practically a machine for the production of milk. The environment the present-day cow was not always what it which was and the incorrect feeding frequently responsible formainly $_{
m the}$ poor standard of the stock. and for many of the troubles with which they were often affected. The output of milk from a cow depended almost entirely on the quantity and composition of the food which was given to it. Regularity observed in feeding and milking could influence the milk yield to the extent of 4gall, to 4gall, milk per cow per day. Negligence in regard to the food supply would even upset the results of good breeding. and it was the weakest point in the dairying industry of South Aus-Food was necessary to maintain the tissues of the body, as the destruction of tissue was always proceeding. A food ration should have palatability and succulence, and it should be varied from time to time. Hay, fed by itself, was not a milk producer, but mixed with bran, lucerne chaff (which should contain the lucerne leaf), and crushed linseed provided a good feed. Bran was a concentrate containing the protein necessary for milk production. Such foods as bran were too rich to feed alone, and had to be mixed with bulk foods. Natural pasture was unquestionably the best food, as it contained the proper balance of nutrients necessary for milk production, but as it was not always available, it was necessary to make other provision. Wherever possible, a small patch of lucerne, even \(\frac{1}{2} \) acre, should be grown, as it would ensure the supply of a quantity of succulent food so necessary for milk production. The value of such a patch was almost inestimable, as a sick cow or horse would relish a little green lucerne when no other food would tempt it, and it might possibly be the means of saving the animal's life. Fodder crops could also be advantageously sown on fallow land to provide quantities of green The value of ensilage was incalculable; its manufacture merely consisted in putting together suitable green stuff at the proper time, and conserving it in a silo. It could be kept over considerable periods, and it provided a solution to the difficulty of securing succulent food during drought periods. (An article by Mr. Suter on the Conservation of Green Fodders as Ensilage appeared on pages 177-184 of the September, 1915, issue of the Journal).

A dairy cow, weighing approximately 1,000lbs. live weight and yielding 3galls. daily, required in her food ration the following food nutrients (in lbs.):—Dry matter, 25 to 28; protein, 2 to 2½; carbo-

hydrates, 12 to 15; fat, ½ to ¾; of which the body required—dry matter, 13; protein, ¾; carbo-hydrates, 7; fat, ¼; and the amount available for milk production was—dry matter, 12 to 15; protein, 1¼ to 1¾; carbo-hydrates, 5 to 8; fat, ¼ to ½. Each pound of milk produced (after the body demands were satisfied) required .46lbs. of dry matter, .067lbs. of protein, .26lbs. of carbo-hydrates, and .02lbs. of fat. In addition to these food nutrients, an abundance of pure water was essential to a vigorous milk flow.

A 1,000lbs. live weight cow fed with the following ration would receive sufficient for maintenance and production of milk, and additional food would only be stored up and cause an increase in weight:—

Ration.	Dry Matter.	Protein.	Carbo- hydrates.	Fat.	Nutritive ratio.
	-	- 20	lbs.	lbs.	
35lbs. green lucerne		1.29	2.56	.21	
18lbs. wheaten chaff	16.35	.64	8.29	.19	1 6 5
81bs. oaten straw	7.26	.09	3.08	.06	
Slbs. bran	7.06	.89	3.37	.20	
	37.67	2.91	17.30	:66	

The next ration, however, would provide just sufficient foods to provide for maintenance and milk production:—

Ration.	Dr	y Matter.	Protein.	Carbo- hydrates.	Fat.	Nutritive ratio.
2011 man lucoma		6.00	1.11	lbs. 2.19	lbs. .18	
30lbs, green lucerne 12lbs, wheaten chaff			.43	5.53	.13	1:5.9
5lbs. oaten straw 6lbs. bran		$\frac{4.50}{5.29}$.06 .67	1.93 2.53	$.04 \\ .15$	
oros. oran	• •	0.28				
		26.73	2.27	12.18	.50	

With the following two rations, in which the food supply was reduced still further, the cow would be insufficiently fed, and the milk supply would consequently be reduced:—

Ration.	Dry Matter.	Protein.	Carbo- hydrates. lbs.	Fat.	Nutritive ratio.
15lbs. green lucerne 8lbs. wheaten chaff 3lbs. oaten straw 2lbs. bran	7.29 2.72	.55 .28 .03 .22	1.09 3.68 1.15 .84	.09 .08 .02 .05	1:6.8
	14.77	1.08	6.76	.24	
Ration.	Dry Matter.	Protein.	Carbo- hydrates. lbs.	Fat.	Nutritive ratio.
12lbs. green lucerne 6lbs. wheaten chaff		.44 .21	.87 2.76	.07	1:7.1
3lbs. oaten straw Ilb. bran	2.72	.03	1.15 .42	.03 .02	1:1.1
	11.47	,79	5.20	.18	

The following were six rations which could well be fed in the Northern Areas for milk production:—No. 1—15lbs. wheat and oaten chaff, 4lbs. oaten straw, 8lbs. bran, 2lbs. copra cake. No. 2—10lbs. oaten chaff, 8lbs. lucerne chaff, 6lbs. crushed barley, 4lbs. bran. No. 3—16lbs. oaten chaff, 6lbs. crushed barley, 6lbs. bran, 1lb. linseed. No. 4—20lbs. pumpkins, 10lbs. wheaten chaff, 5lbs. straw chaff, 7lbs. bran, 2lbs. linseed. No. 5—25lbs. piemelons, 8lbs. bran, 12lbs. chaff, 5lbs. straw chaff, 2lbs. copra cake. No. 6—30lbs. green lucerne, 12lbs. wheaten chaff, 5lbs. oaten chaff, 6lbs. bran.

Any of the further list of daily rations was to be recommended, half to be fed in the morning and half in the evening:-No. 1-20lbs. pumpkins, 10lbs. lucerne chaff, 10lbs. oaten chaff, 6lbs. bran, 2lbs. linseed. No. 2-20lbs. pie melons, 10lbs. chaffed cornstalks, 10lbs. lucerne chaff, 6lbs. bran, 2lbs. cocoanut oil cake. No. 3—10lbs. oaten straw chaff, 10lbs. lucerne chaff, 6lbs. bran, 1lb. linseed, 1lb. molasses. No. 4—18lbs. wheaten chaff, 5lbs. pea straw, 8lbs. bran, 2lbs. copra cake. No. 5-30lbs. pie melons, 15lbs. oaten chaff, 5lbs. wheaten straw, 8lbs. bran. No. 6—15lbs. lucerne chaff, 10lbs. oaten straw, 6lbs. bran, 21bs. copra cake. No. 7—15lbs. oaten chaff, 8lbs. pea straw, 6lbs. bran, 2lbs. copra cake, 1lb. molasses. No. 8-14lbs. oaten chaff, 10lbs. oaten straw, 6lbs. bran, 2lbs. pollard, 2lbs. copra cake, 1lb. molasses. No. 9—12lbs. lucerne chaff, 6lbs. wheaten chaff, 4lbs. oaten straw chaff, 4lbs. bran, 1lb. copra cake. No. 10—10lbs. wheaten chaff, 6lbs. lucerne chaff, 8lbs. oaten straw chaff, 6lbs. bran, 2lbs. linseed meal. No. 11— 10lbs. oaten chaff, 8lbs. lucerne chaff, 6lbs.crushed barley, 4lbs. bran. No. 12—15lbs. oaten chaff, 4lbs. oaten straw, 8lbs. bran, 2lbs. copra cake. No. 13-15lbs. oaten chaff, 6lbs. crushed barley, 2lbs. bran, 2lbs. linseed. No. 14—20lbs. pumpkins, 10lbs. wheaten chaff, 5lbs. straw, 7lbs. bran, 2lbs. linseed. No. 15—25lbs. pie melons, 15lbs. chaff, 5lbs. straw, 8lbs. wheat, 2lbs. copra cake. No. 16—40lbs. mixed silage, barley, and oats, 10lbs. lucerne chaff, 8lbs. bran. No. 17—35lbs. No. 18—30lbs. mixed maize silage, 12lbs. oaten chaff, 10lbs. bran, silage, oats, and barley, 10lbs. oaten chaff, 10lbs. bran.



CONFERENCE OF NORTHERN YORKE'S PENINSULA BRANCHES.

The Annual Conference of Northern Yorke's Peninsula Branches of the Agricultural Bureau was held at Kadina on Thursday, March 16th.

The Minister of Agriculture (Hon. C. Goode, M.P.) attended, and was accompanied by the Poultry Expert (Mr. D. F. Laurie), the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.),

and the Acting Secretary of the Advisory Board of Agricul-The following gentlemen repreture (Mr. H. J. Finnis). Branches ofthe Agricultural śented the undermentioned Bureau:-Kadina-G. H. Weidenbach, G. R. Bruce, J. A. Cowley, J. N. Pedler, W. Major, H. Pearson, P. D. Anderson, E. H. White, R. Correll; Maitland-C. A. Pitcher, J. Bentley; Balaklava-P. H. Roediger, H. Roberts; Paskeville-T. H. Price, H. J. Drewitt, P. H. Uren, T. R. Brinkworth, J. C. Price; Moonta-W. J. Brinkworth, W. B. Stacey, P. Ford, A. B. Ferguson; Bute-W. H. Sharman; Arthurton-J. H. Colliver, W. J. Angel, J. Welch, T. H. Howlett, W. R. Stephenson.

The President of the local Branch, Mr. Correll, who occupied the chair, extended a hearty welcome to the visitors, and called on the Hon. C. Goode, M.P., to declare the Conference open.

THE MINISTER'S ADDRESS.

The Hon. Minister of Agriculture (Hon. C. Goode) in declaring the Conference open, referred to the reputation of the South Australian farmers in the other States. The improved methods of cultivation which they had adopted were largely attributed to the Agricultural Bureau system, and he made an appeal for them to stimulate interest in that institution.

THE WHEAT SCHEME.

Referring to the scheme which had been adopted for the handling of the wheat crop this year, the Minister said there was no doubt that farmers were getting more for their wheat than would have been the case had the Government not undertaken the marketing of the crop. Most people were agreed that the Government had done the right thing in securing freight, for they were in the best position to get the freight if it were to be obtained; certainly they would get more than would have been secured by merchants. More especially was this the case, as they were able to enlist the influence of the Imperial Government. Farmers should not lose sight of the fact that the conditions were extraordinary, and that extraordinary measures were necessary to cope with the contingencies as they arose. The scheme as it now existed had evolved; and had been modified and altered to meet the exigencies of fast changing conditions. He then discussed in detail the factors which had operated in determining the nature of the scheme, and the circumstances which made it necessary.

THE MERCHANTS' COMMISSION.

Criticism had been levelled at the commission which was being paid to the Government agents; but he asked them to remember that the merchants carried the responsibility for the crop from the time it was delivered to them until it reached the buyer. They undertook the risk of the weather, paid the lumpers, re-bagging charges, etc., and were responsible for storage and delivery as they would be if they were themselves the buyers. They were not expected, however, to carry the risk of damage from weevil and flood. The merchants were doing a great deal of good work, and the Government was reaping the benefit of their experience.

FREIGHT.

The key to the whole situation was freight. It was difficult to realise the position, even when they were acquainted with the quantity of shipping that had been sunk, and that which had been diverted for military purposes.

The highest rate of freight they had had to pay had been 110s., and it had only been possible to secure it at that figure because of the powerful influence that had been exerted on behalf of the Commonwealth. Argentine was paying 150s., and Australia would be paying 170s., if not more, if they had to secure their freights at the ruling rates of the world's markets. It was usual for Argentine under normal conditions to secure a higher price for wheat than was secured by Australia, but because of the lower freights secured under the scheme, Australia was getting a better price for wheat than either Argentine or Canada.

There had been contention in some quarters, that they should have gone into the freight market earlier than they had, but it would be seen that there was nothing in this, as they had commenced making inquiries as early as September, but the shipowners would not enter into any agreements at such an early date.

THE INFLUENCE OF THE IMPERIAL GOVERNMENT.

He had already referred to the influence which the Imperial Government had exerted on the oversea shipping interests. This was strikingly illustrated in the case of the *Seapool*. The owners of this vessel were given the alternative of sending her to Australia, or having her commandeered. The transports were also carrying cargoes of grain, and this could not have been arranged had the merchants been handling the freights.

THE ULTIMATE PRICE OF THE CROP.

No one could speak with any assurance as to the ultimate price that the farmers would receive for their grain. There was one point, howeve, that they should not lose sight of, and that was that the Government, by its action, had saved the financial position, and averted a serious crisis. The financiers of the Commonwealth were agreed that this was so. Merchants, whose available capital at the time would have been very limited, would not have been able to continue in the market for longer than was necessary to meet their immediate sale requirements, and as a result, immediately these had been satisfied, conditions in the market would have become chaotic.

He was hopeful that an average of 4s. 6d. per bushel would be secured for the whole of the crop. The price was made more doubtful on account of the larger crop, as the carry-over would be so much greater.

In South Australia the figures had reached a total of 7,000,000bush. above the official estimate, and the position in Victoria and New South Wales was similar. It was now anticipated that up to the beginning of April advances at the rate of 3s. per bushel would have been made, equal to a total of £14,000,000, whereas the banks had worked on an estimate of not more than £11,000,000. It was this fact that made it uncertain as to whether they would be able to advance a further 6d per bushel on April 1st.

THE UNEXPECTED DIFFICULTIES.

In order that they might realise to some extent the unforeseen difficulties with which they met, he mentioned that 11 boats had been secured for January shipments, but all of these had been commandeered.

SAND DRIFT.

A paper on this subject was contributed by Mr. W. Buchanan, of the Bute Branch, in the course of which he said:—In many of the agricultural districts of South Australia, more especially during dry years, where the land under cultivation is of a sandy loam, pervious in nature and loose in formation, sand drift during the summer, under the influence of cyclonic weather, prevails. Thus from cultivated paddocks clouds of ever-shifting sand are distributed and re-distributed over the whole face of the district.

Nature seems to have foreseen the advent of the industrious plough, and low, undulating ridges, sandhills, or sand dunes, covered with natural growth, lie in parallel lines, almost in every instance northwest and south-east, as it were in lines of barricade, to obstruct the heavy north winds, mitigating their effect on the soil. To clear every obstruction, as is practised in many hundreds, brings retribution in the form of hurtling clouds of sand drift. Therefore it is imperative, unless the whole contour of many districts is to be changed, that the natural wind-breaks be left intact and improved wherever possible by a judicious system of tree-planting.

Those councils which jealously guard their roads from the depredations of the axe are worthy of high commendation. The farmer will ponder deeply before he allows every tree to be indiscriminately sacrificed; rather will he reserve strips of timber as windbreaks on those sandhills, which, if denuded, will certainly drift. If such were practised by all, combined with the careful preservation of the natural growth on the roadsides, and further augmented by systematic tree-planting, this great evil would in time wholly disappear. Re-afforestation, and not de-afforestation, should be our aim.

The paper was well received, and vigorously discussed, especially in regard to the wisdom of leaving standing scrub along the roadway, and the efficacy of cultivation in stopping the drift.

CO-OPERATION AMONGST FARMERS.

In a paper dealing with this subject, Mr. T. H. Howlett said:— The suggestion of co-operation among farmers and Bureaux has received a fair amount of consideration from the various Branches of the Bureau of this State. Judging from the tone of the majority of papers supplied, it is obvious that the authors feel confident that co-operation among farmers would be a gigantic success. Indeed, the problem is something which the average farmer has not yet considered, and which, if solved, would remove the greater portion of the financial obstacles that beset so many who have ofttimes to work 16 hours a day to retain However, a few of the writers are inclined to take a somewhat different view as to what would really be the position were the farmers in general to adopt a systematic form of co-operation. It is only when one considers how far-reaching the organisation would necessarily be that the bristly side of the question stands out. Many Branches have advocated co-operation in the purchase of machinery and phosphates, and suggest that an order for a number of binders, harvesters, drills, and other requirements would be the means great reduction prices. ofinBut generally find the makers alive to fact that the machinery we the had. whether purchased singly or by the dozen, and it is only when a firm has an opportunity of cutting out other makes that they are prepared to make an allowance for large orders. Past experiences have taught us that the farmer who prefers a certain make of harvester, binder, or other implement, is prepared to pay several pounds extra rather than accept any other make. Hence the difficulty to give a large order to one maker. The same is equally true with reference to phosphates. Many farmers will not use one brand only, though it be 2s. or 3s. per ton cheaper. Of late years phosphate companies have not been anxious to make a liberal concession on large orders. Then I have noticed that some writers have stated the advisability of the Bureau purchasing binder twine for its members, and no doubt a reduction might be had on binder twine rather than on many other articles. Yet, when it is considered that the average farmer uses only from three to four bales per year, the individual saving is not sufficient to compensate the extra labor and inconveniences which may arise. Should the twine prove unsatisfactory, some members have a tendency to blame the secretary, or whoever may have been good enough to undertake the extra labor Others recommend co-operation in stockand worry gratis. breeding, but one has only to visit a small number of farms to be fully convinced of the hopelessness of ever succeeding. One farmer in 10 prefers a good breed of horse, and he is willing to exert all his energies to attain his ambitions. While, on the other hand, a fair percentage is fond of a good beast, yet have other ideals that are of . equal importance. Others again are interested in stock only as far as £. s. d. are concerned, and the breed, care, and comfort of the horse gets very little consideration as long as he can work. Such a mixture of characteristics is not very likely to produce a beneficial result from co-operation. I have read of co-operation in dairying districts in the purchase of a well-bred bull, and the same has had a very satisfactory result in raising the standard of dairy cattle. But in these districts very few people have to derive a living from dairy-farming, so that the thought of improving dairy cattle is not likely to receive much We also have the suggestion of co-operation of consideration. farmers in new districts in the form of purchasing implements jointly, also in pooling various kinds of work. In the purchase of machinery there is a possibility that money might be saved. (I refer principally to beginners cropping a small area.) A binder, winnower, grader, portable chaffcutter, and scrub roller might well serve for several farmers who are within reasonable distance of each other. Co-operation in the purchase of these implements would mean a convenience and saving of time which the farmer could not gain individually. The idea of pooling labor must necessarily apply to the more closely-settled districts where fruit and vegetables form the greater portion of the living. Even in such districts it would be a very hard matter to find the equilibrium which is so often demanded To pool labor in scattered districts would mean a loss of time in getting from one farm to the other, also the inconvenience of one being away from home at certain times when there are numerous items which require attention. So it seems that no matter in which direction we look, co-operation has more disadvantages than However, it seems essential that the farmers will have advantages.

to co-operate in self-defence, otherwise it is obvious that the burdens which are always accumulating will soon grow too heavy. one the less fortunate farmers will have to part with the land that they have endeavored to retain by not only spending what money they had previously saved, but also many years of their best strength How, then, is the necessary co-operation to be brought If it were possible for farmers to co-operate so that they could export and import, the key to the situation would be handy. But such an undertaking would require practical commercial men at the head, and is a scheme which would require years to set in motion. It seems necessary that some form of co-operation among farmers should be adopted. But this should not be merely a few men meeting together and making an order for several farm machines, a few hundred tons of phosphates, or a ton of binder twine, and then leaving the remaining arrangements to be carried out by someone who acts as honorary secretary. Not until every one of us is prepared to put the same energy into a co-operation as he puts into his farm work, can we ever hope to meet with any measure of success."

POULTRY.

The Poultry Expert (Mr. D. F. Laurie) addressed the Conference. For egg production in South Australia there was no more suitable fowl than the White Leghorn of the South Australian laying strain. In dealing with the question of breeding, he mentioned that the hen should be not younger than her second season, i.e., 18 months to two years old. However, in the case of a proved layer or breeder, this rule might be relaxed, the bird then being used until she was four or five years of age. Vigorous male birds from nine to 18 months old, would be found to give optimum results. A vigorous male White Leghorn might be mated with from six to 12 hens, and when on free range with up to 20 hens.

Fertilisation of the egg took place in the upper portion of the oviduct. After successful mating eggs laid on the second day would be fertile. As a result of tests made at the Roseworthy Poultry Station it had been ascertained that fertile eggs would be laid by the hens until the 17th day after the removal of the male bird. For practical purposes, however, it could be taken that the eggs would be fit for setting purposes seven days after the male was introduced to the hens, and that after he had been taken from the pens for a period of seven days, it was unwise to attempt to use the eggs for hatching.

The characteristics which should be looked for in the male birds were fair size, plenty of saddle and neck hackle, legs fairly stout and wide apart, toes straight, wings large and carried low, back long,

wide between the shoulders, good chest, tail flowing. The bird should also be active, courageous, a good crower, and possess red eyes.

Females should have long backs, tails slightly fanned, heads fine, eyes red, combs medium-sized and fine, and be broad at the shoulder, deep behind the legs, which should be straight. The birds should be of fair size, and very active.

SINGLE TESTING.

When layers were to be bred, the lecturer advised penning a given number of pullets in separate "single pens." A careful record of the production of these should be kept for a period of 12 months. Eggs laid at the end of the fourth month, and subsequently, should be over 20zs. in weight, with good shell. The hens should show no signs of broodiness, sickness, &c., and should lay not less than 220 eggs. The hen must be of good size, as, whilst the runts might lay well, the flock would soon deteriorate if these were bred from.

When single testing could not be arranged each bird should be penned separately for a few days until she had laid. Any that laid eggs under 20zs. in weight, or which had rough, mis-shapen shells should be rejected. Then, if the birds were selected with regard to the points enumerated, fair results might be expected.

SIRE AND DAM.

In poultry breeding it was of the greatest importance to know the breeding of both the male and the female. A male bird transmitted the characters for high egg production and size of eggs from his dam to his daughters. Therefore he should be the son of a first-class layer, also of a layer of full-sized eggs.

The hen must be a good layer also, as she transmitted her laying power and the character for large eggs through her sons to his daughters. Therefore the cockerels of a first class hen were specially valuable for future breeding. Any bird which showed any weakness or defect should be rejected. Brother and sister mating should be avoided, but also the introduction of unrelated blood. They should always breed within the strain. In introducing fresh blood, the progeny of any mating must be kept separate and tested before being incorporated into the flock.

First-class laying stock was valuable, and was the only kind worthy of the farmer's attention. Stock of unknown value imported so much risk that it should be avoided.

TABLE BIRD BREEDING.

The general purpose, or all-round breeds, were best suited to our conditions They were Orpingtons, Rhode Island Reds, Plymouth Some strains of Wyandottes laid very small eggs, but if of Bocks. Red Sussex were good, but the good strain the breed was valuable. eggs were on the small side. They should not attempt to rival the White Leghorn in egg production, but be content with 160 to 180 eggs per year, because the extra value of the chickens as table poultry would make up for the lesser number of eggs. They should keep to the type, and avoid the runt-like so-called laying strains. Fatten the chickens well, and market them when from four to five months old. As a rule, one male to from six to eight females gave good results with the heavier breeds.

FEEDING ON THE FARMS.

All birds should sleep in houses in a fox-proof enclosure. Special breeding and chicken-rearing pens should be provided. The birds should be fed on mash in the morning, green food at mid-day, and Mash, wet, was made as follows:-Bran one part. grain at night. pollard two parts, chaffed green feed or hay chaff soaked three parts. Make soup of meat meal, using 1lb. per 100 birds, and add salt 1oz. Scald the bran, and allow it to swell, then rub in the per 100 birds. pollard and soaked chaff or green food to produce a crumbly mass. Per bird, wet mash 24ozs, to 3ozs, daily. The grain should consist principally of wheat, with occasionally stout white oats, and in winter pease and barley when available. It should be fed in straw litter at the rate per bird of 1½ozs. daily. A patch of lucerne for summer use, berseem for winter, and marrow kale for all seasons should be grown, and also rape, mustard, green barley, oats, &c. Green stuff could be fed ad. lib. It promoted health, egg production, and rich-colored yolks.

DISEASES.

The chief disease affecting farm poultry in this State was roup (Avian diphtheria). However, it now caused less mortality than formerly. As a rule, the eyes were affected, and patches of cheesy growth were seen in the mouth. When it appeared it was best to isolate all affected birds, and give twice daily 1 teaspoonful of olive oil, to which are added three drops each of eucalyptus and kerosine. Some of this should be rubbed over the head also. A pinch of powdered bluestone should be applied to ulcers and cankers should be destroyed, and the carcases burnt.

PARASITES

Worms (Heterakis sp.).—The common round worm caused great loss. Its presence could be detected by the following symptoms,

yellowish diarrhoea, thirst, sometimes ravenous appetite, shrunken face and comb. Post mortem—Worms in long gut. The remedy was worm paste, and the whole flock should be given a dose every three months as preventive treatment. Ticks constituted the greatest menace to the poultry industry, and no effort should be spared to eradicate them. Old infested buildings should be burned, and kerosine used freely. Lice.—When lice were troublesome insect powder should be dusted on the birds, and kerosine applied to woodwork.

(To be continued.)

A CURIOUS CASE IN A HORSE.

Mr. F. E. Place (Government Veterinary Lecturer) gave a demonstration to farmers in the neighborhood of Ninnes on Wednesday, March 15th, and among the cases presented to him was a valuable chestnut horse of Mr. Gardner's that had a discharge from the near ear of a chronic character, and was so sore about the organ that he always had to be tied up to have the winkers put on.

The Veterinary Surgeon located a movable body under the lower cartilage of the ear, and decided on its removal, which was painlessly carried out under cocaine, the horse, normally very fidgety, standing without control. The operator said he was going to remove a tooth, a statement that caused some amusement among the practical horsemen standing by; but this was quickly changed to astonishment when he handed a developed molar tooth to one of them.

The occurrence of a tooth in such a position is known to scientists, who call it an ectopic dentoma; it arises from a displacement of a tooth-developing centre during growth. The majority never develop, but, as in this case, such takes place on rare occasions, and the tooth is now a valued possession of the owner.

AGRICULTURAL BUREAU REPORTS.

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^{*}No report received during the month of March. + Formal report only received.

‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings— May 10th and June 14th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD,)

COOMOOROO (Average annual rainfall, 11in. to 12in.).

February 26th.—Present: six members.

Lessons from the Harvest.—Mr. N. S. Lilleerapp initiated a discussion on this topic. He said that farmers in the district sowed their wheat early in dry ground, with the result that weeds, principally mustard, came up very thickly and choked the wheat crop. Late-sown crops in most instances had proved the best. Unless good, clean fallow were available, seed should not be sown before rain fell. Mr. E. Berryman said that superphosphate sown with the previous season's crop which had been a failure, had had little effect in the past season, and farmers were therefore well advised to sow superphosphate at every seeding. Mr. C. Phillis said that where farmers dipped seed wheat for pickling, the solution should be changed frequently in order to secure satisfactory results. Mr. Toholke recommended King's Early wheat for withstanding dry weather, but most members favored Federation variety.

HOOKINA (Average annual rainfall, 12in.). March 14th.—Present: eight members.

SEEDING OPERATIONS.—Mr. F. Stone read a paper on this topic. He said that when harvest work was completed, farmers should prepare for seeding by overhauling the drill and cultivator and repairing swings and chains so that no time would be lost when rain fell. Seed wheat should be put through the winnower a second time, and pickling should be done sufficiently long before sowing to allow of the seed drying. Pickling on a floor with bluestone solution was the method to be recommended, and no seed should be sown without being thus treated. Seed selection was a matter to which more attention should be given. It was plain to all that a plump grain would produce a more vigorous plant than a pinched grain. If farmers took a little trouble with the selection of their wheat, change of seed would be unnecessary. For local conditions the best varieties were King's Early, Federation, and Bluey-early, medium, and late, respectively. Their different times of maturation enabled the farmer to harvest them to the best advantage. Late wheats usually gave the best returns, therefore only a sufficient area to provide hay and seed should be sown with King's Early. April and May were the best months for seeding, but it was preferable to delay until the middle of June than to sow the seed After the rain fell the ground should be cultivated to a depth of 2in. and the seed then drilled in. Harrowing after the drill was unnecessary in their locality. The Chairman (Mr. D. E. Madigan) expressed the opinion that members should cooperate for the purpose of buying a grader. He favored the early sowing of early varieties of wheat, as they matured more quickly and were less susceptible to hot winds.

MORCHARD (Average annual rainfall, 11in. to 12in.). February 19th.—Present: 13 members and three visitors.

Pic Sties.—The Chairman (Mr. B. S. McCallum) initiated a discussion on this subject. He said that concrete sties could be put up fairly cheaply if the farmer could burn the necessary lime on his property. By putting plenty of stone in the

walls they could be made very secure, and the sties would be very comfortable in the winter. Wire-netted yards should be provided at the rear of each sty to enable the pigs to exercise sufficiently to keep them in good health. Mr. C. Halliday (Wepowie Branch) said that it was a bad practice to keep the pigs overcrowded. They required plenty of exercise and fresh air, and therefore plenty of room in the yards. They should always be supplied with plenty of fresh drinking water. the yards. They should always be supplied with plenty of fresh drinking water. Mr. E. J. Kitto had built stone pig sties at a big expense, but had found that stone walls were a failure, as the pigs soon broke the walls away. Wire netting yards, well constructed, were the most satisfactory, and a shelter shed should be provided in each yard. Pigs always did better if given plenty of liberty. He also recommended sowing rape for early green feed, and had found nothing better for sows and young pigs. Mr. J. W. Riechstien said that stone and concrete walls in pig sties should be protected with wood on the inside. If this were done they would remain in good order for a long period. Mr. R. Jasper said that rape and Cape barley were most suitable for early green feed in the Far North. If pigs had plenty of green feed they did not require so much corn. Mr. G. Gregory found that pigs did well in fair-sized wire-netting yards with shelter provision.

QUORN (Average annual rainfall, 13.78in.).

March 18th.—Present: seven members and one visitor. Wheat Pickling.—In a paper on this topic, Mr. Britza emphasised the need for careful and thorough pickling of seed wheat. The method he adopted was to use kerosine tins finely perforated, three-quarters of which were filled with wheat, and immersed in the pickling solution. On being removed they were placed on a trough Mr. Noll favored

which drained into the vessel containing the pickling solution. immersion of the bag containing the wheat. Mr. Brewster recommended farmers to secure good, sound wheat, when little trouble with smut would be experienced.

WILMINGTON (Average annual rainfall, 18.26in.).

February 16th.—Present: 16 members.

MARKETING OF WHEAT.—Mr. B. Jericho read a paper on this topic. He said that farmers should realise that only by sowing the cleanest and best quality seed wheat could they expect to produce a prime sample of wheat for market. was keen at almost every buying centre, and that fact combined with the system of paying agents by commission often induced them to accept inferior samples as Under no circumstances should that be allowed. The present system of fixing standard was not satisfactory, inasmuch as no inducement was offered to market clean samples. The buying standard should be so fixed as to ensure to the careful farmer offering a good, clean sample a higher price than to the one who offered barely the standard wheat. In the States of America there were fixed annually four distinct standards for the agents' guidance. For winter wheats it was generally 60lbs., 58lbs., 56llbs., and 52lbs. per bushel, and sampling was done by means of testing scales. With one standard the receiver generally passed wheat on sight testing. Of course wet wheat or badly smutted had naturally to be accepted on sight testing. Farmers here were not likely to call for this rigid system of sampling, but something would have to be done in order to retain good market against strong competition. At present it paid no farmer to clean wheat twice for market in order to deliver a 67lbs. or 68lbs. sample. For his personal benefit he could mix a percentage of white heads or other foreign matter with a prime sample, thereby increasing weight and still sell wheat that passed the testing scales. Bulk handling would be of assistance to the receivers, and disclose many bagged up Members generally agreed that the grader would remove all foreign seeds if of a small nature, but it would not remove large seeds such as barley. Jericho, in reply to the Chairman (Mr. W. Slee), stated that wheat was tested by measurement in Great Britain, and that South Australian wheat was equal to the standard of other countries.

WEPOWIE, March 21st.—Considerable discussion took place on the subject of suitable varieties of wheat for the district. Opinions differed as to the suitability of the district for the growth of Federation.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BEAUFORT.

February 24th.—Present: six members.

Mr. Sampson thought SEED WHEAT.—A discussion on this subject took place. some varieties were less susceptible to smut than others, and those were the varieties which they should cultivate. Mr. Yard said, in an early season, a variety of wheats should be sown, commencing with, say, Marshall's No. 3, and following with Gluyas and other varieties. Mr. Wilson supported this practice, as a variety was frequently more successful in one season than another. Mr. H. C. Underwood said that of the smutty wheat he had sown, that which was sown dry was free of smut,

whilst that sown in very wet ground was badly affected.

At a previous meeting Mr. H. C. Underwood read a paper on the conservation of fodder. He said that, owing to lack of fodder during the recent drought, a great number of stock had to be sacrificed, and in order to prevent a recurrence farmers should conserve, and endeavor to keep in stock, sufficient fodder for 12 months' requirements. In addition to growing wheat for hay, he advised sowing oats or barley for that purpose in rotation with wheat. use of the thresher was also to be recommended in order to prevent all waste of For storing oats, he advised the use of old iron tanks as more profoodstuffs. tective and economical than bags. Threshed straw, well stacked and protected from the weather would remain in good condition for a number of years, and after being chaffed, if damped with molasses and fed with a proportion of crushed oats, would prove a ration quite suitable for working horses. The feeding of grain to sheep was undoubtedly a profitable practice. If confined in a small paddock they would fatten on a ration of 1½lbs of oats per head per day. Cocky chaff was also a valuable fodder reserve. Ensilage was practically untried in some districts, but it was an easy matter when green feed was abundant to fill a pit with suitable greenstuff; and its feeding value, particularly to milking cows, could not be questioned. Mugford said that an extra quantity of hay should be put by each year as a reserve, and Mr. P. Underwood supported this view by recommending the establishment of a two years' reserve supply of hay. Messrs. W. B. and J. Sampson urged that greater areas of crop should be cut for hay. Mr. Yard recommended chaffed oats for the purpose of fattening sheep.

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.

February 18th.—Present: 11 members.
Cows on the Farm.—Mr. A. Bartrum read the following paper on this subject:—"Cows on the farm are very profitable if properly managed. The dairy herd should be thoroughly tested, for it will pay better to feed a few good cows than a lot of inferior animals, as the extra work involved in the latter case does not produce a correspondingly increased return. I favor the Shorthorn breed for any localities where a certain amount of hardship has to be endured by the cows. The Jersey is good, but requires sheltered conditions, and a good well-drained yard. Milking bails should be well paved and thoroughly drained, and all dairying utensils should be kept in a suitable building; separator, cream cans, and milking Regular milking hours should be obbuckets should be kept scrupulously clean. served; cows being fed while being milked. One should always breed from the best sire available, and in selecting a sire due consideration should be given to the productive capacity of his female ancestry. The calf should be taken from the cow immediately it can walk; the cow will not hold back her milk, and the calf is more easily taught to drink. With the present shortage of milking cows all female calves should be raised. One of the most important items in dairying is to make provision for a good supply of green fodder for the summer months, either in the form of ensilage or fodder crops such as lucerne, sorghum, and maize. silage is easily made, and there are numerous methods adopted for its manufacture. The pit gives good results when put down in good holding ground; a round or oblong cavity being preferable to the square, as the stuff subsides more evenly. The site selected should be slightly elevated to allow of good drainage. A cereal crop which will cut two tons of hay, if cut for ensilage will make six tons of succulent fodder. Members favored feeding cows with bran and chaff twice a day with green feed occasionally.

BOOLEROO CENTRE (Average annual rainfall, 15.83in.).
March 17th.—Present: 12 members.

POULTRY ON THE FARM.—Mr. R. W. Stanton read a paper on this subject. said that on the average farm, where the market for fresh eggs was usually rather distant, it was inadvisable to concentrate upon egg production. The White Leghorn breed, which were the best egg-producers, were not markedly suited to average farm Such breeds as the Orpington, Rhode Island Red, Plymouth Rock, conditions. Wyandotte, Sussex, and Faverolle would always find a good market, either as chickens or full-grown birds. In addition to being good table birds, they were good layers, and were quiet birds, well suited to farm conditions. When they had laid an appreciable number of eggs, they could be relied upon to hatch out a setting of eggs and carefully rear the chickens hatched. Average specimens of the breeds named could be secured at reasonable prices, as it was unnecessary to secure the highest grade. The breeds should not be mixed, but should be kept as pure as possible. It was a good plan to secure a good male bird from a well-established poultry farm, whose services should result in the improvement of the flock. In the discussion which followed, members agreed that where poultry were kept on the farm, they should not be allowed within the precincts of the stable and stackyard.

CRYSTAL BROOK (Average annual rainfall, 15.62in. February 19th.—Present: 27 members.

CRUELTY TO ANIMALS.—In a paper on this subject Mr. R. Townsend drew attention to the following instances of cruelty frequently occurring on farms:—Young stock allowed to wander in paddocks without proper feeding, until they become very low in condition, while stocks of fodder are available at the homestead. Kicking horses or beating horses with pitchforks, shovels, or fencing wire; overloading and compelling horses to continue work when exhausted; shoeing horses in a careless manner; use of ill-fitting harness, more particularly collars, which were very frequently in need of stuffing; driving a horse on a warm day without allowing him the opportunity of taking a drink; tieing a horse up in a cold, exposed condition without protective covering; flogging a horse when it shied at any object such as a heap of road metal—the fault might be the driver's, or the winkers might fit too closely; allowing stock to stand in a bare paddock on a hot day without covering or shade; allowing a dog to follow a cart or trap long distances on a hot day; indiscriminate use of firearms in hunting, with the result that harmless birds and animals were frequently maimed; allowing children to keep pets without ensuring that they gave them proper attention. All these instances of cruelty, he said, caused acute suffering to the animals, and each should do his utmost to prevent their occurrence.

MUNDOORA (Average annual rainfall, 14.11in.). February 21st.—Present: nine members and one visitor.

Harvest Results.—Mr. Noble said he had secured the best results from Combination and King's Red wheats, the average being about 12bush. per acre. Mr. C. H. Button found Gluyas best, with Marshall's No. 3 next. Mr. Carman also had good results from Gluyas. Mr. W. Bates said he had had his best returns from Marshall's No. 3, yielding up to seven bags per acre, next best varieties being Yandilla King and Gluyas. Mr. W. Hancock had found Marshall's No. 3 the most successful variety. Mr. J. Clothier reaped 17bush. an acre from Correll's No. 7, but thought the wheat too late for the season. Carmichael's Eclipse and King's Red had not been the success that they usually were. Marshall's No. 3 was still a firm favorite, as it yielded well, and was a good all-round wheat, being well suited for hay.

NORTH BOOBOROWIE.

March 21st .- Present: seven members.

DARYING.—Mr. S. E. Mudge contributed a paper on this subject. He said that where dairying was the main object, a herd of pure Jersey cows would give the greatest satisfaction. Jerseys, however, suffered severely from the effects of cold weather, and it was therefore necessary to provide warm sheds for their accommodation during the winter months. Where dairying was a secondary matter, a cross between the Shorthorn and Jersey breeds was to be recommended. These animals produced a fair-sized calf, which could be reared and sold at a profit. In view of present prospects, it should pay to rear all calves; if a secure paddock, warm shed, and plenty of feed and water were

available, little trouble should be caused. A plot of lucerne was a valuable aid in this connection. In purchasing cows, only the best should be selected, as a good cow was no more expensive and no more trouble to keep than a poor one. In the selection of a sire, also, the greatest care should be exercised, not only in regard to breed, but also as to the strain to which the bull belonged. It was only by using the progeny of good butter-producers that the best results could be obtained in breeding. He thought it was an unprofitable practice for every farmer to keep a bull, and suggested that a private individual or co-operative concern should keep the necessary bulls, securely fenced, in a central position, and make a fixed charge for their use. By selling or exchanging these bulls at intervals in-breeding would be avoided, and improvement in the type of stock would be effected. It was important to have the cows coming into milk at the proper time, which in their district was March or April. They could then be milked for nine months, and allowed to rest for three months during the busy Feeding of cows required careful study. Lucerne and oats harvest period. were excellent fodders, and could be grown to advantage on the flats in the The marketing of cream presented some difficulty, but that could be overcome by the establishment of a co-operative factory. The keeping of cows on the farm admitted of the keeping of pigs and poultry to great advantage.

PORT PIRIE (Average annual rainfall, 13.21in. January 15th.—Present: nine members.

FEATURES OF 1915.—In a paper with this title, Mr. J. Greig quoted a number of gures showing the distribution of rainfall during the year. The winter was one figures showing the distribution of rainfall during the year. of the mildest which he could recollect, no extreme conditions being experienced. Although the total rainfall was not very high, it was distributed over the growing period to great advantage. The excellent crops which had been reaped could not be attributed to moisture conserved from the previous year, nor to good cultivation, as in many cases opportunities for thorough soil cultivation had been infrequent. The warm soil and the favorable weather conditions prevailing at seed time had resulted in a good germination, and the cereal crops had thus received an excellent Precipitations throughout the growing period, also, had been most oppor-The fact that the soil had had an almost complete rest during the previous year, and the destruction of many disease germs as a result of the drought, also had The conditions which would prevail during the a beneficial influence on the crops. approaching season were, of course, unknown, and farmers should cultivate their land to conserve moisture in the soil and make adequate preparation for possible adverse conditions. Mr. Welch thought that if a fall of 3in. of rain had occurred in March wheat crops and feed would have given better results. Mr. Eagle remarked that early crops suffered severely from the effects of hot winds during Sep-The Chairman (Mr. F. A. Johns) said that, although smut had been prevalent, in cases where pickling with bluestone had been resorted to very little smut had occurred.

PORT GERMEIN (Average annual rainfall, 12.84in.). February 26th.—Present: nine members.

PIG RAISING.—In a paper contributed on this subject, the writer said that the state of the meat market should induce producers to pay some attention to the rearing of stock which reached maturity in the shortest space of time. His experience of pig raising was that it was a very profitable undertaking. For example, during the last 12 months, he had made a net profit of £22 9s. 6d. on pigs. To secure good results it was necessary to keep good pigs, which were likely to thrive under the conditions which obtained on the holding. The Yorkshire and Berkshire were both suitable breeds. Feeding was of very great importance. Barley was an excellent food, and areas could with advantage be sown with this cereal. Skimmed milk, fed with grain, was very fattening, and could not be put to better use than feeding to pigs. By curing the pork before marketing a quantity of scrap meat and lard was retained, on which an appreciable sum could be realised. Mr. Deer said that soaked wheat as a food was as efficient as the crushed grain. Mr. Stone preferred selling pigs as soon as they reached a marketable age rather than to cure the meat.

WHEAT PICKLING.—Mr. Stone initiated a discussion on this topic. Mr. Carmichael said that the care exercised in keeping wheat-handling machinery clean was

an important preventive measure against the spread of smut. Mr. Blesing said that climatic conditions had an important bearing on the occurrence of smut. Mr. Hillam used bluestone solution, and found it very effective. Drills should be carefully cleaned so that seed should not be reinfected with smut spores. Mr. Hacket had found both bluestone and formalin to be effective pickling solutions.

MOUNT BRYAN EAST, March 11th.—The Chairman (Mr. J. Thomas) delivered an address on the value of the Bureau. The remainder of the evening was devoted to a social in honor of Mr. F. Tralaggan, on the eve of his departure for the front.

NORTH BOOBOROWIE, March 1st.—Seventeen members and 20 visitors attended a demonstration and lecture given by Mr. Place, Government Veterinary Lecturer, at the Booborowie Government Farm.

PORT BROUGHTON, March 17th.—Experimental Work.—The Hon. Secretary, Mr. J. H. Fletcher, contributed a paper on this subject. He emphasised the need for careful and systematic experimental work to be conducted by farmers. Experimental plots laid down in a haphazard fashion meant only a waste of time and energy. Members supported the paper, and Messrs. Bawden and T. Pattingale referred to the need of improving the grain yield of wheats grown in the district.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

BLYTH (Average annual rainfall, 16.46in.).

January 29th. Mr. A. L. McEwin contributed a paper in which he made suggestions regarding work which should be carried out on the farm at that period of the year. Preparation for seedtime was a most important matter, and required much forethought and planning to ensure successful seeding operations. If farmers devoted proper attention to the work of preparation, seeding could be carried out expeditiously and without hindrance. The necessary seed should be secured early. It should be thoroughly cleaned and pickled in ample time before it was actually All available straw should be stacked, as it could then be kept without waste and utilised with advantage for making up a ration, for example, when stock were feeding on green stuff. Harness should be put in order, and implements thoroughly overhauled and defects remedied. Fences should have atten-Harness should be put in order, and imtion, and a pile of cut wood provided for use in the household; if an engine was available on the farm a circular saw would prove a profitable investment for sawing up roots. Cultivators and harrows should be taken out, and the fallow put in thorough order for seeding. If the time was available, harvesting machinery could also be overhauled, and if repairs were not then effected a statement of parts and work required to put the machinery in order could be compiled, and put in the box of the harvester, so that the work could be carried out expeditiously before harvest time approached. Finally he would urge every farmer to keep a diary. Its record of work done, weather conditions, &c., was very valuable and instruc-

CLEANING WHEAT FOR MARKET.—Mr. H. W. Eime contributed a paper on this topic at a recent meeting. He said that the preparation of wheat for market had of late been somewhat neglected. This was attributable to several causes. In earlier years lesser quantities of wheat were grown, and farmers took greater pains to produce a good sample. Competition amongst merchants had tended to make the farmer careless, for if wheat was docked by one merchant, farmers could take it to another merchant, and probably secure full rates for it. The introduction of the harvester and its general adoption had the effect of reducing the quality, as it did not do the work of cleaning as thoroughly as the winnower. Farmers should realise that if they took more trouble with their wheat they could raise the standard to such an extent that a much greater demand would be created for South Australian wheat, with more profitable results to the farmers. A well-cleaned sample weighed to better advantage than a dirty sample, and the rejected grain could be utilised as pig and poultry food. All stock, wool,

fruit, &c., realised prices according to their quality, and wheat should be graded in the same way. Greater care should be taken in the working of the harvesting machinery, the riddles and screens should be kept clean, and any wheat reaped during damp weather should be put through the winnower a second time; whenever a sample was unsatisfactory the process of winnowing should be repeated.

NANTAWARRA (Average annual rainfall, 15.90in.).

February 17th.—Present: seven members.

MANURES.—Mr. G. Dixon contributed a paper on this subject. He said that if farmers expected to secure the best returns from their soil, they must maintain it in good condition, not only chemically, but also physically. A few years' bad treatment of a soil would cause it to give very poor returns. It was absolutely necessary to artificially replenish from time to time the content of plant food in the soil, more particularly phosphoric acid. The nitrogen content was also a very important matter. This could be maintained in several ways. Every fall of rain introduced into the soil a certain quantity of nitrogen compounds. certain organisms in the soil whose function was to convert suitable material into available nitrogen, and the mechanical condition of the soil had an important bearing upon their activity, as vegetable matter decayed more rapidly in well cultivated soil than in that the cultivation of which was neglected. The growing of certain crops assisted in maintaining the nitrogen content of a soil, while the growth of all forage crops were a valuable aid to securing good physical condition of the soil. Mr. Sleep said that the amount of rainfall and the atmospheric changes were the principal factors governing the success of a crop. Mr. Sutton strongly advocated the adoption of a system of rotation of crops. The change from growing wheat to oats and barley was very beneficial to the land.

SALISBURY (Average annual rainfall, 18.57in.).

November 2nd.—Present: nine members.

QUESTION Box.—A number of questions were asked and answered by members. For orange trees which appeared to be "sickening," cutting back, watering, and manuring well, and possibly root pruning were suggested. A fortnight after blooming was me time recommended for the cutting of wheat for hay. For improvement of orange trees, grafting gave bigger stocks than budding, but the latter practice was mostly adopted. In the r district grafted trees were liable to suffer damage by flood. The Compuda variety of orange was described as an upright and vigorous grower; fruit oval in shape, and borne in clusters. The Mexicana variety was more uniform in foliage, and the fruit was not so oval in shape and borne more regularly.

SALISBURY (Average annual rainfall, 19.57in.). March 7th.—Present: 10 members.

Harvest Results.—Mr. H. Bussenschutt submitted a report on the experimental plots which he had conducted with varieties of wheat. The preparation of land for the general crop on his holding consisted of ploughing, harrowing, and twice scarifying between July and September. Oats and Baroota Wonder wheat were sown with lewt. of superphosphate to the acre at the beginning of May, and yielded 2 tons of hay to the acre. Mr. R. H. Bagster reported that his land, some of which had been under peas and some lying out the previous season, was sown in May-June with Gluyas Early wheat at the rate of 1 bush. to the acre, together with 100lbs, mineral super, per acre. A return of over 2 tons of hay to the acre was secured from this fallow land, which was rolled, scarified, and harrowed and sown with 1½bush. of New Zealand Cape oats and 100lbs, mineral super per acre, and gave a return of 2 tons of hay per acre. Hay stubble, scarified and rolled in March, scarified again and sown in April after rain with New Zealand Cape oats and 100lbs, mineral super, per acre, also gave a return of 2 tons of hay. It was noted that Gluyas, which had a tendency to go down under normal conditions remained upright and produced first-class hay. Mr. W. W. Shepherdson said that his land had not been fallowed, but when soaked with rain in the middle of May was ploughed, harrowed and drilled with 1½bush. of King's Early wheat and 1 cwt. of mineral super, per acre; a return of 3 tons of hay to the acre was secured. Stubble

land sown with a crop for the third successive year yielded 2 tons of hay to the acre. Mr. E. Moss cultivated in the third week of December land which had been cropped in the previous year. The land was left until near seeding time, when it was scarified twice and harrowed before and after drilling; 70lbs. of Marshall's No. 3 wheat and 60lbs. of superphosphate per acre were sown, and a return of 2 tons of hay to the acre was secured. Mr. W. J. McNicol ploughed a portion of his land in July and August, cultivated it in September, and again in February. It was sown in May with 60lbs. Baroota Wonder wheat and 10lbs. oats, together with 100lbs. superphosphate per acre, and it yielded 35cwts. of hay to the acre. An area which had been a failure in the previous season was cultivated in May, and sown with 60lbs. Golden Drop wheat and 100lbs. superphosphate; and it yielded about 4 tons of hay per acre. Another area, which had also been a failure in the previous year, cultivated in May, and sown to oats, gave a similar yield. The crop sown on the fallow land grew fairly well until November, when fully a third of the plants turned white and were little better than straw when cut.

BALAKLAVA, February 26th.—Consideration was given by members to the report, furnished by Mr. G. H. Stevens, on the wheat selection competition conducted under the auspices of the Branch.

LEIGHTON, February 17th.—Mr. J. McDonald initiated a discussion on the present system of weighing wheat, and the advisableness of creeting a weighbridge was considered.

LEIGHTON, March 16th.—A discussion took place on the system of weighing wheat practised by agents, and members favored a proposal to instal a weighbridge as a means of securing satisfactory treatment.

ROSENTHAL, February 25th.—The Acting Secretary of the Advisory Board (Mr. H. J. Finnis) attended the inaugural meeting and explained the functions and advantages of the Agricultural Bureau.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BUTE (Average annual rainfall, 15.42in.).

February 15th.—Present: 15 members. THE WHEAT HARVEST .- Mr. S. Trengove contributed a paper dealing with the causes of the small yields which were reaped from crops which earlier in the season were full of promise. He said that one of the causes of the disappointing yields was the fact that the fallowing of the land, and all the subsequent workings it received, were done when the ground was in a very dry state. Again, at seed time in many cases the farmer found that his supplies of horse feed had given out, so he hurried his crop in as quickly as possible. The rain that fell early was sufficient to start the wheat, and did not damp or chill the subsoil. The heat in the ground caused plant life to grow very quickly, and indeed, every one remarked how rapidly the wheat and feed grew. In the absence of checking frosts, the wheat plant grew up slender and tender, and the heads began to form earlier than usual. Just at that time the much-dreaded red rust appeared, and the tender condition of the wheat plant caused it to succumb to the effects of the rust and the trying weather conditions that set in. Each day the rust increased, and with a few hot days seemed to arrest the development of the crops, which assumed a very sickly appearance. A very heavy frost occurred about the first week in November, and this was followed by very trying northerly winds till about the middle of the month. A severe hot north wind then followed, and that day reduced the average of late, rusty crops by several bushels per acre. Another hot spell hurried the ripening of the wheat once again, and crops that had a tinge of green were ready for harvesting within a few days. There was no doubt that the crops that yielded well ripened slowly. Summed up, the causes of the low returns were dry fallowing, rapid and unchecked growth of the crop, the disastrous effects of the red rust upon the sappy growth of wheat, and finally the severe late frosts and hot winds.

WESTERN DISTRICT.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

February 19th.—Present: seven members and one visitor.

Care of Horses' Feet.—In a paper with this title, Mr. H. B. Phillipps emphasised the importance of paying proper attention to horses' feet. He said that a horse should never be shod until over two years of age, as before that time the horse's foot was rapidly growing, and the practice of shoeing tended to contract the foot. When taking shoes off a horse, the clinches should be raised with the buffer; the shoes should not be forced off, as that tended to break the crust and destroy the horn. If the shoe did not move easily, the nails should be punched back and pulled out. If the frog was healthy only sufficient cutting should be done to clean it. The hoof should always be rasped down to ensure that the shoe fitted well, taking care that the heel was not cut too low nor allowed to remain too high, as either condition caused a strain on the leg. Horses that were kept in stable a good deal required extra attention to prevent trouble with their feet. In answer to Mr. Wake, the writer of the paper said that the horse's hoof should

be burned only sufficiently to secure a straight bed for the shoe.

HARVEST.—Mr. F. Chilman thought that the hot wind was the chief cause of his disappointing harvest results. Mr. P. C. Wake reported an average of 7½bush. Rust had been the cause of considerable loss; he recommended sowing early. Mr. Dawkins said that oats had proved very successful. He did not favor excessive applications of superphosphate for wheat-growing only, but said that heavy dresslings were of value where the land was intended for grass in the succeeding season. High-grade superphosphate was the most profitable to use. "Smut proof" wheat had given very good results. Mr. A. O. Chilman recommended Gluyas variety for grain, and Golden Drop for hay. He did not advise sowing large areas for

grain on account of the prevalence of rust.

KOONIBBA.

March 16th.—Present: nine members and one visitor.

CARE OF IMPLEMENTS.—A paper on this subject was read by the Hon. Secretary (Mr. E. O. Dahl). Mr. Hasting recommended straw for roofing an implement shed, for the reason that the interior of a shed so roofed was cooler than any Mr. E. A. Payne did not favor oiling drill discs, as the oil held the sand, and caused the bearings to wear very quickly. Mr. Dahl, in reply, said that straw was a dangerous roofing material, on account of its liability to take fire. His experience had shown that oil was much better than grease for application to drill discs. Members agreed that it was most important to provide a good shed in which to house the implements.

> KOPPIO (Average annual rainfall, 22.40in.). March 14th.—Present: eight members and visitors.

WHEAT VARIETY TESTS.—The Hon. Secretary (Mr. T. R. Gardner) submitted the following report on the experimental work conducted by Mr. G. B. Gardner:-Plot No. 1, Federation, yielded 22bush. 22lbs. per acre; Plot No. 2, Doris, yielded 20bush. 54lbs. per acre; Plot No. 3, Cooper's, yielded 17bush. 16lbs. per acre; Plot No. 4, Dart's Improved, yielded 21bush. 32lbs. per acre; Plot No. 5, Yandilla King, yielded 17bush. 50lbs. per acre; Plot No. 6, West Australian Crossbred, yielded 13bush. 32lbs. per acre. The average of the six plots was 18bush. 55lbs. per acre. Plots were each half an acre in area, and sown with seed and superphosphate at the rates of 1bush. and 1cwt. per acre respectively. The land was ploughed in May, drilled on June 14th, and harrowed after the drill. In growth the plots appeared to be fairly even, with the exception of West Australian Crossbred, which was rather patchy, and yielded the lowest. Unfortunately no record of the rainfall could be kept as there was no gauge on the farm. The season was very favorable up till the end of September, after which no rain fell. Had good spring rains fallen the results would have undoubtedly been much better. Considering the very dry spring the sample of grain was very good. Several members spoke in praise of Federation wheat, which yielded best with almost all. Grading of seed wheat was generally favored by those present.

> MILTALIE (Average annual rainfall, 14.55in.). February 18th.—Present: 10 members.

RABBIT TRAPPING.—Mr. W. G. Smith contributed a paper on this topic. that after many years' experience in combating the rabbit pest, he was convinced that trapping was the most effective method of extermination on areas which were not too extensive. The trap with the dust plate attachment was the best type to use, as it was so constructed that it would only spring when he rabbit stepped on that part of the plate which would allow the jaws of the trap to grip sufficient of the rabbit's leg to hold it. The traps should be fastened firmly to good flat iron pegs of length suitable to the nature of the soil. The trap should not be set too close to the burrows, and it should be placed in an excavation of such a size that the trap would be level with the surface of the ground; earth should first be placed around the spring and pressed tightly in order to hold the trap firmly in place. A sieve should then be employed, and enough fine earth sifted over the trap to cover it without preventing it from working. A rabbit's hind foot should then be used to press down the earth around the trap, and present on the surface the natural footprint of the rabbit. It was very important to thoroughly fill in all trapped burrows when removing the traps, and any burrows which were re-opened should be trapped again. Provided that fences were kept rabbit-proof, this mode of action would be found very effective.

IMPROVEMENT OF BUREAU WORK.—In a paper on this subject Mr. W. G. Smith urged members of the Bureau to introduce non-members to meetings, so that they would appreciate the advantages of the institution and become members. Farmers, he said, should not be selfish and reserve to themselves any knowledge which they gained, but should give their neighbors the benefit of their experiences in the interest of the locality and the State generally. Members should undertake experimental work on their farms, and with the assistance of the Department of Agriculture, they could probably solve many problems which now puzzled them, and possibly improve their farming practices to a considerable degree. A farm library was a very useful adjunct to the Bureau, and it should include all the volumes of the Journal of Agriculture, bound with their respective indices, so that reference

could easily be made to it.

MOUNT HOPE,

March 10th.—Present: six members.

CARE OF HORSES.—The Chairman (Mr. T. Speed) opened a discussion on this sub-He said that if horses were kept in a small paddock, they required less attention than if they were stabled. Hay should be slightly on the green side, and a mixture of wheaten and oaten hay was preferable to either fed separately. better to feed oats with the hay than to feed over-matured hay. Mr. R. Myers expressed the opinion that many horses were overworked. Horses should have regular hours of work, and should be fed at regular intervals with a properly-balanced They should be accommodated in a good stable free from draughts, and should not be allowed to drink when overheated. Mr. Hillier thought that seven hours of general farm work per day was sufficient for a horse. Harness should have proper attention, more particularly collars. Mr. H. H. Myers said it was a mistake to feed horses at mid-day without removing their harness, as the practice not only resulted in injury to the harness, but the horses should also have the comfort of being out of their harness whilst feeding.

SALT CREEK.

February 12th.—Present: 11 members.

Co-operation.—Mr. W. Lee, jun., contributed a paper on this subject. He urged farmers to adopt some co-operative system which would enable them to market their produce to much better advantage, and to secure for themselves the profit which was acquired by the middlemen. In purchasing their supplies and requisites a co-operative concern would secure for them the advantage of being able to deal direct with manufacturers, and thus secure advantageous terms. A co-operation of farmers would be a valuable institution in time of drought, as it would be an excellent means of distributing relief to farmers.

YADNARIE (Average annual rainfall, 14.09in.). February 19th.—Present: seven members.

Farming Methods.—In a paper on this subject Mr. J. J. Deer said that farmers would, in future, be faced with a very considerable shortage of labor, and it would be necessary for them to adapt their methods of farming to meet the needs of the times. It would not be possible for them to sow such large areas, and it would therefore be necessary to sow more thoroughly such areas as could be dealt with.

Land should be well tilled, and seeding should not be continued too late in the Fallowing operations should not be delayed, and the land should be well dressed with fertilisers in order to make it as productive as possible. The employment of labor-saving machinery and the increased efficiency of farming methods were the only means of meeting the shortage of labor. Discussion ensued, in which Mr. J. H. Kruger drew attention to the possibility of securing profits from keeping on the farm sheep, cows, and poultry.

YANINEE.

February 19th.—Present: 13 members.
FRUIT TREE PLANTING.—Mr. G. D. Parker contributed a paper on this topic. He said that a site for fruit trees should be selected on an eastern slope, free from stumps and stones; land with a clay subsoil was the most suitable, and it should be ploughed or dug, and allowed to lie as fallow for a while before planting. Holes for the trees should be made about 4ft. deep and 3ft. square, say, a month before planting, which should be done in June. When planting, 8in. or 9in. of surface soil with mould and ashes should be put in the bottoms of the holes, shaping the centre into a small mound, and the tree should be placed on this, the roots spread into position, and the filling of the hole completed. The tree should then be given a good watering. An economical method of watering trees was to let into the ground, 3ft. or 4ft. away from the trees, a kerosine tin, the bottom of which was perforated with holes. By pouring water into this the trees could Japanese Burbank plums, nectarines, peaches, be kept watered very economically. oranges, and lemons were to be recommended. Orange and lemon trees should be planted not later than September. Other varieties could be planted from May until the end of July. All trees should be protected from the south wind by hes-If protection were not provided the trees would become very sian or brush. badly shaped. If any tree did not give satisfaction it should be grafted or Grafting could be done during July or August, budded with a good variety. preferably during the latter month.

EASTERN DISTRICT. (EAST OF MOUNT LOFTY RANGES)

FORSTER (Average annual rainfall, 10in. to 11in.). March 18th.—Present: four members.

Mr. W. Searle said that land should be prepared for seeding by clearing up stubble, stumps, shoots, &c. Fallow land should be harrowed over so that all weed seeds would germinate with the first rain. Harness should also be put in good re-In reply to a question by Mr. Searle, members agreed that wheat badly affected with smut should not be sown without pickling. Pickling of seed three months before sowing would prove effective. The drill frequently deposited smut spores on the seed which passed through it.

PINNAROO (Average annual rainfall, 16.74in.). March 17th.—Present: 14 members.

STIMULATING INTEREST IN BUREAU WORK .- Mr. F. G. Bonnin supplied the following paper on this subject:--"In presenting this paper for your consideration I have endeavored to draw attention to some of the advantages to be derived from belonging to the Bureau, and also to pick out some of the weak spots in this Branch which militate against its being of maximum value to its members and to the district. I have hit out pretty straight on one or two points, but I hope no one will take exception to any hard truths I may bring home, and that all will accept what I say in the same spirit that prompts me to say it, viz., for the benefit of the Branch. Before touching on matters directly connected with this Branch, I think we will do well to consider for a few minutes the following question:—'Is it worth a farmer's while to belong to the Bureau?' To this question every right-minded man on the land must emphatically answer 'Yes'; and yet it would appear, from the half-hearted way in which some of cur members attend the meetings, that they do not fully realise the immense

benefits that are to be derived from enthusiastically supporting the Branch. I think probably the best way to bring home to any doubters the usefulness of the institution is through their pockets, and I will therefore endeavor to show that 1s. 6d. subscription, and the time spent in attending meetings, are negligible as compared with the amount that one stands to make through their Everyone will agree with me as to the real value of experience in all matters connected with farming-in fact some of us have already paid a pretty stiff price for it. Now, one of the great points in favor of our meetings is that it enables us to discuss many subjects of vital interest to us, and we can all profit by the experience of others, and in probability avoid making costly mistakes in our own work; and for this reason alone I maintain that the time and money expended in Bureau work are well and profitably spent. Some misguided individuals will say that they can learn nothing by attending the meetings. To them I say that they should be philosophic enough to come along and give the less enlightened members of the community the benefit of their profound knowledge. The younger members probably stand to derive more benefit from the meetings than the older hands at the game; but as new methods are continually replacing old ones in nearly all branches of farming, it is more than likely that the oldest members can be enlightened to their advantage on some points by men with actually far less all-round knowledge. There is a vast amount of truth in the old saying that 'No one is too old to learn,' and it is particularly applicable to all rural pursuits, and by coming together and exchanging our various experiences we can teach each other to our own individual advantage, and to the benefit of the State as a whole. Another very important point about the Bureau is that through its agency we can at all times get into direct touch with the Government experts on all subjects relating to our work. For instance, who can doubt the value of the subjects relating to our work. For instance, who can doubt the value of the lectures given here from time to time by our popular and capable veterinary surgeon, Mr. Place? Those lectures were made possible and were delivered in our midst through the instrumentality of the Bureau, and I noticed that a great many who are not members were glad enough to avail themselves of the opportunity, and benefit by Mr. Place's remarks. There are numerous other advantages to be gained by belonging to the Bureau; but I will not dwell further on them now. Any man who owns or works land will speedily be convinced of the advisableness of enthusiastically helping in the work of the Branch, if he will only pause and reason it out. The fact that the numbers of Branches and of members throughout the State are increasing by leaps and bounds each year goes to prove that a very large majority of the agriculturists are keenly alive to the importance of the institution. Now, as regards the Pinnaroo Branch. I am informed, on good authority, that we are considered a strong Branch by the officers in the city. Numerically, we may be fairly strong; but I am reluctantly compelled to say that we are not getting nearly as much good out of our Branch as we ought to. What, then, is the reason for our falling short? I can answer the question without hesitation. It is the lack of interest and half-heartedness of a great many of our members, which manifests itself in various ways, such as irregular attendance, turning up late at meetings, taking no part in the discussions, and forgetting to pay their subscription till they are chased for it. How, then, are these lax habits to be overcome, and the Bureau made to attain its right place in our midst? There is, in my opinion, only one way in which this can be done, and that is by individual effort and zeal on the part of the defaulters, and also by the continued hearty support of those who already take an active part. Our Branch is doing useful work now, but it can do much better work, and do it more efficiently, if all members will make a special effort to attend every meeting and take a live part. It is also of great importance that members should be more punctual than has previously been the rule with a great many of them. Turning up half an hour after time means a big delay at the start, and the result is that by the time the formal business is put through, and a paper read, the night is well advanced, and a great many of us are tired and thinking more of getting home to bed than we are of the subject on hand. I feel sure that the late starts which we invariably get have got a lot to do with crippling the discussions, and there is really no reason for it, as in practically every case members could easily turn up to time if they would only set their minds to it.

Do not say to yourselves, 'Everybody will be late; it's no good me hurrying to be there at 8 o'clock.' I am afraid a good many do work on that principle, but it is a bad one, and though it may have held good in the past, let us see to it that it does not in the future. There are a lot of our members who, though they attend fairly regularly, are very backward in taking part in the discussions. This is a great mistake, as in many cases the discussion on a paper will produce quite as much information as the paper itself, and I think it encourages the writer, even if the remarks should be in the nature of criticisms. I say, therefore, that it is strongly in their own interests for members to take an active part in this important stage of the meetings. I do not advocate long speeches as a general rule, but I think every member should endeavour to say something on the subject in hand, if it is only to endorse a previous speaker's remarks, or to ask a question; and if all would do so our meetings would be more lively, more attractive, and of far more benefit to all concerned than they are when all the talking is left to three or four members only, as has often been the case in the past. It would greatly lighten the work of the Secretary and his assistant if everyone would pay their subscription at the beginning of each session. Eighteen pence a year is a trifling amount, and I fail to see any reason why it should not be paid as soon as it falls due; and yet in our last report it was mentioned that amounts were owing, a position which no one can be proud of, and one which I hope defaulting members will speedily redeem, if they have not already done so. I am rather at a loss as to what to suggest to revive interest in the Bureau. There is, however, one branch of work which up to the present we have scarcely touched on. I refer to experimental plots. This work, if systematically attended to, would be of unfold value to the district, and could hardly fail to interest all members who are seeking to wrest a livelihood from the soil, whether on their own land or on the share system. The plan I would like to see adopted is, briefly, this:—The Bureau would hire a few acres of land near the town—perhaps some philanthropic member would lend it free of charge. The members could have a working bee every now and then, and all do a little towards tilling the land and putting in and taking off the crops. I would not for one moment discourage private experimental work; let that be carried on, too, by those who feel disposed to tackle it; the more the better. My idea in suggesting plots centrally situated is that everyone could help in the work of looking after them, and would, I think, take a greater interest in them as a whole; and also the work would not be all thrown on one or two men just at the busiest times of the year; no one need lose more than a day or two. I should like to hear the opinions of members on this all-important subject, and also any other suggestions as to how the work of the Bureau may be forwarded. In conclusion, I would remind you that the Branch is entirely in our own hands to make or to I have no hesitation in asserting that it can be made a most potent factor in modifying and improving our methods of farming, if it only receives the wholehearted support which is its due. Do not forget that every man among us exerts an influence one way or the other. Remember that by regular and punctual attendance at meetings, and by taking an active part in discussions, each member will profit himself intellectually, and in all probability financially also He will benefit and help to push forward his own district, which, in turn, will become a more valuable asset to the State, and in these troublous times through which we are passing the State needs all the support we can give it. It is up to every man to try and get the best possible results from the land at his disposal. The Bureau can be made to be a real live agency in helping us to attain this end; and now, at the beginning of our session, I confidently appeal to each member individually to support it to the very best of his ability." Mr. E. H. Parsons said if every member had received half the benefits he had derived from membership of the institution, then the Bureau must be doing a wonderful amount of good throughout He emphasized the wisdom of criticism of subjects introduced to meetings, even though it might be on condemnatory terms. Mr. Roy Edwards spoke of the Conference of Branches and Annual Congress, at which gatherings the Departmental experts were always present, and handled subjects of vital importance to the man on the land. Mr. L. M. Hannaford suggested the circulation of the paper amongst the laggard members, and among residents who it was considered should be members of the Bureau. Mr. F. H. Edwards remarked that in questioning an ex-member concerning his reasons for not attending the meetings, he received the reply that he had not been able to meet anyone who could benefit him. He (the speaker) contended that that was a very poor spirit, and considered if any residents were so well informed on farming matters as not to need further tuition, he should at least give his fellow-beings the benefit of his experience. Three residents, although not deeming it worth while to join the Bureau, had found it convenient on one of Mr. Place's visits to bring along horses for inspection and operation. He urged the need of experimental plots, especially for the purpose of hand selecting seed. As an instance of what could be done, he quoted that two years ago he planted 28 grains of wheat, and now for sowing this coming season he had 12lbs. of excellent graded seed. Mr. H. Ledger said that it was not only upon the surface, as it were, that good was to be seen. Members could penetrate deeply into many matters, and gather points which did not at first appeal to their minds. Mr. F. Laycock was of the opinion that farmers would do well to experiment more widely than had been done in the past.

ROSY PINE.

March 15th.—Present: 11 members and one visitor.

Noxious Weeps.—In a paper on this subject, Mr. C. Lee said that each year the man on the land had to combat with an increasing number of weeds, as well as insect and fungus pests. It was therefore necessary for him to take advantage of all means to decrease their numbers, and if possible, achieve their eradication. Apart from the natural increase of weed plants, the importation of fodders and seeds caused the appearance of a number of new and troublesome weeds. Producers should not relax their efforts in combating these pests, and whenever an unfamiliar plant made its appearance, it should be forwarded to the department for identification, so that its character could be determined.

RAMCO.

December 13th.—Present: six members..

Mixed Planting of Fruit Trees.—Mr. F. Lewis read a paper on this subject.

He said that after an orchardist had planned the planting of his land with trees, each variety to be in a separate block, it frequently happened that there were insufficient trees of one or more varieties to complete the planting. Also, perhaps, at the end of the first year, owing to disease or other causes a percentage of the trees died. In cases like these, the orchardist very often replaced these trees with members of a different variety. This was a practice which he condemned very strongly, for many reasons. It detracted from the appearance of the orchard; it was a great disadvantage in the work of pruning, owing to the difference in treatwas a great disadvantage in the work or pruning, owing to the difference in new ment required. Cultivation of the orchard was impeded by the existence of different types of trees in the rows, and resulted in irregular and unsatisfactory work. Economical irrigation was impossible, as the quantity of water required varied with the kind of tree. In spraying, the plant would probably, at great inconvenience, have to be moved about for the treatment of individual trees. The greatest drawback, however, was the delay caused in harvesting. The time for this was very limited, and it was imperative that it should be done with the least possible delay. Considerable extra work was involved in moving to the different blocks to harvest the fruit, and the loss of time which resulted might have an appreciable effect on the harvest return. Nearly all these remarks applied with equal force to the planting of vines as well as fruit trees. In addition the different kinds of vines, owing to the manner of their growth, required different provision for trellising. Currants were considerably earlier than other vines, and when the fruit was off a field of were considerably earner man other vines, and when the first was on a near or that variety was often used for grazing, but if other kinds were present, this could not be done. A foreign variety, however, could usually be grafted without difficulty, and with currants and sultanas the best method of replacing a blank space was to "layer." This consisted in selecting a long cane on a neighboring vine, bending it downward to the place required, burying that in the ground to a depth of 4in., and turning the end up sharply, leaving two or three buds above ground. By the time that the cane rooted the new vine would be well established. If it was desired to have a variety of fruits for household use, the best plan was to set apart a piece of ground near the homestead for the purpose.

STIRLING'S WELL.

February 19th.—Present: 25 members.

FODDER CONSERVATION .- Mr. B. Lauterbach contributed a paper on this topic. He said that every farmer should conserve his cocky chaff, and the best way to do it was to store it in a shed, but where a shed was not available, it could be successfull stored in a heap, with a covering of straw, and would remain in good condition for a couple of years. A stack of straw should also be kept on the holdings as a standby, and to be used for winter bedding. The experiences of the drought should have taught farmers to make provision for the future recurrence of such conditions. It should be the endeavor of every farmer to retain on his holding a stock of fodder sufficient for two years' requirements. If a scanty season was then experienced, it would help to carry him through till the next season. In the newer country where sufficient hav could not be cut owing to the land not being in good condition for the binder, the value of cocky chaff should not be overlooked. It could be mixed with the hay chaff or fed with a little pollard. Many farmers used cocky chaff mixed with oats, pollard, or molasses all the year round, and their horses were always in good condition. Very little value was placed on straw by most farmers, and they preferred to burn it in the field, fire rake it to destroy the shoots, and to clear the land for the next crop. But where a good stack of hay did But where a good stack of hay did not exist on the holding a stack of straw should be kept, and a firerake could be run over the land where the straw was raked off, with good results. Many northern farmers pulled down the thatching from their stables and sheds during the drought, and thus saved their horses and stock from starvation; good clean straw was a good feed for horses or cattle during the winter months, where hay was scarce and there was no dry feed in the paddocks, and there was, of course, a danger of horses becoming "sanded" by putting them out on short green feed.

WILKAWATT (Average annual rainfall, 16in. to 17in.). February 19th.—Present: 11 members.

EXPERIMENTAL PLOTS.—Mr. M. Neville reported on manurial tests with wheat conducted by him, as follows:—

								Yie.	ld.
Plot.	Treatment.							Bush.	lbs.
1	56lbs. minera	al super.				 	 	 19	46
2	84lbs. ''	ı î			٠.	 	 	 19	57
3	112lbs. ''	4.4				 	 	 19	50
4	No manure					 	 	 8	20
Wook plat a	arm with Thuch a	e Clarred	1	2004		 			

Each plot sown with 1bush, of Gluyas wheat per acre.

SEEDING OPERATIONS.—Mr. A. Neville contributed a paper on this topic. He said that one of the chief difficulties with which they had to contend was the occurrence of 'takeall,' and the preparation of the seed bed had some influence on its prevention. The land should be harrowed in front of the drill, and the seeding operations should be succeeded by rolling and a further light harrowing. A better germination would then be secured, and that was an important step in the production of a good crop. For working the land a good tine cultivator or skim plough was the best implement, as with light soils only shallow cultivation should be practised, a depth of 2in. being quite sufficient. In the discussion which ensued, several members condemned the working of fallow land whilst it was dry, and recommended cultivating after a fall of rain when the weeds had germinated. One member favored broadcasting seed in order to secure an even germination; several members supported the practice of shallow sowing for the light soil in the district.

ported the practice of shallow sowing for the light soil in the district.

PIG RAISING.—The Hon. Secretary (Mr. W. J. Tylor) read the following paper on this subject:—''Housing.—The aim of the producer in laying out the sty or piggery should be to provide ventilation and warmth, and to achieve this in this district, one must protect with a good wall the southern and western sides. The walls on the southern and western sides should be made of either stumps or 'pug' in order to afford protection from the cold south-westerly winds for the young pigs. The sties should face the north; if the eastern, southern, and western sides are walled in to keep out cold weather, then along the northern side pig netting can be used with a couple of barbed wires placed onea on the surface of the ground and another 6in. high in order to prevent the pigs damaging the bottom of the fence. The yard adjoining each sty should be 20ft, long by 12ft, wide. This will allow plenty of room for the pigs that are to be reared solely in the sty. The roof of

the sty should be about 4ft, to 5ft, above the ground level to allow of the circulation of plenty of fresh air in hot weather, and a broom roof covered with straw will help to keep it cool in summer and warm in winter. Plenty of straw bedding should be provided, and the yards kept clean, as the pig will become one of the cleanest of animals if the owner does his part. I prefer the Berkshire and Mid-Yorkshire; both these breeds can be marketed when from eight to 12 weeks old, and a good return obtained. If well fed, the Berkshire-Yorkshire cross supplies a very good marketable pig at three months old. Crushed grain, wheat, barley, and oats make a good ration. Soak all crushed grain if possible, and change food every few days. In 'forcing' pigs for market it is advisable to give them a little Epsom salts in the food occasionally, and plenty of charcoal should be placed so that the pigs can have access to it whenever they feel so inclined. Lucerne and any green fodder is relished, also root crops, both of which grow admirably in these soils, and go a long way to keep the pigs healthy. Plenty of water should be handy at all times, and in summer it is a good plan to hose the animals in middle of day. They enjoy it, and it also helps to keep away vermin. But care must be exercised in hosing Yorkshire pigs, as they are more likely to scald than the Berkshire if allowed Where vermin have made their appearance to run in the sun after the washing ... machinery oil poured along the backs of the pigs once or twice a week for a few weeks will soon rid the animals of them. Young pigs should be castrated when from two to three weeks old, so that they will not suffer a check, as is often the case when they are castrated and then shut away to wean. Weaning should take place at eight weeks if the sow is in fair condition, and then usually seven days afterwards she will come on heat. The main aim of the farmer should be to feed his pigs to quit them at the earliest possible time, and if well fed and looked after they will make a good price at the age of three months, at which time it pays the farmer best A good discussion resulted.

WILKAWATT (Average annual rainfall, 16in. to 17in.).

March 18th.—Present: 17 members and one visitor.

The Hon. Secretary (Mr. W. J. Tylor) reported that he had visited the Government Butter Factory at Port Adelaide, and gave particulars of his visit, and the methods adopted by the factory staff in the testing, making, and grading of butter. Members were keenly interested, and expressed the opinion that the information gained would be of benefit to them in future. It was suggested by the Hon. Secretary that members of neighboring branches should be invited to attend and contribute papers, and that Wilkawatt members should return the compliment. It was thought that this would be an excellent means of maintaining interest in Bureau work.

BOOKPURNONG EAST, March 18th.—Mr. F. H. West contributed a paper on lucerne, which inaugurated an interesting discussion.

MURRAY BRIDGE, January 29th.—The meeting was attended by the Government Horticultural Instructor (Mr. G. Quinn), who delivered an address on "Fruit Culture."

MONARTO SOUTH, February 19th.—The Chairman (Mr. G. Patterson) read a paper from the *Journal* on the dairying industry, and a lengthy discussion followed.

SHERLOCK, February 26th.—Harvest Results.—Members reported on the harvest results, and expressed the view that wheats sown early were best for hay in their district. For grain they preferred to sow an area of each variety. A strong view was expressed that drills should be made with a distance of 5in. between the drills.

WOLLOWA, October 21st.—The evening was devoted to the answering of questions asked by members. It was thought that three or four years was a reasonable age at which to commence breeding from a mare, but it depended greatly on the physique of the animal. The axe or grubber was best for cutting shoots on uncropped land, and the slasher for shoots in a crop. Samples of wheat and barley were tabled by Mr. C. H. Stone.

SOUTH AND HILLS DISTRICT.

CHERRY GARDENS (Average annual rainfall, 35.03in.).
March 14th.—Present: 13 members and four visitors.

EXHIBIT NIGHT.—The evening was devoted to the study of an exhibition of fruits, etc., made by members of the Branch. Mr. C. Ricks tabled an assortment of fruits, onions, wattle gum, and a sample of jelly made from the cores and peels of apples, which demonstrated the good use to which they could be put. Mr. T. Jacobs had on view a few varieties of apples, also jellies and some apple vinegar, which members pronounced to be of excellent quality. Mr. Henry Jacobs exhibited a collection of older varieties of apples, which were still considered worth a place in an The Hon. Secretary (Mr. A. R. Stone) showed many varieties of apples, pears, and figs, together with some samples of dried apples, pears, and plums, which had been sun-dried on wire netting trays. Mr. S. W. Chapman also displayed a number of varieties of apples and pears. An exhibit of fruit from the Mylor Typical Orchard attracted considerable attention. Mr. A. J. Mildwaters showed samples of Gallant's Hybrid and Huguenot wheat, two very useful varieties. profitable discussion took place during the evening.

IRONBANK (Average annual rainfall, 33in. to 34in.). March 17th.—Present: five members and 12 visitors.

CLEANING HARNESS.—In discussing this subject Mr. Leak said that he used warm water and common soap, afterwards applying mutton fat and neatsfoot oil, and rubbing it into the leather with a cloth. Mr. W. Coats did not support the use of soap, as he contended that it injured the stitches. A light application of kerosine was to be recommended. Mr. W. Slater approved of the use of fat black for application to harness.—In reply to a question by Mr. Leak, members said that walnuts could be profitably grown in the district, but other varieties of nut trees had not been thoroughly tested.

KANMANTOO (Average annual rainfall, 17.90in.).
February 19th.—Present: seven members.

Fox Pest.—In a paper on this subject Mr. A. Mills said that during the past five or six years the fox had caused much loss to the sheep farmers in the district. One method of minimising loss would be to yard all ewes or husband them close to the homestead during lambing time. This would entail hand feeding, but the advantage would be more than sufficient to warrant it. Hunting with greyhounds or fox terriers was sometimes effective, but it was a very slow method of destroying the pest. The surest way was to lay poisoned baits. If neighbors co-operated and took measures for the safety of their stock, a good deal could be done. A dead lamb treated with strychnine made an excellent bait, and another method was to make up poisoned fat balls to be laid on a trail. Probably the best method was to trail a dead fowl about the country, and place poisoned parrots or birds at intervals on the trail. Great care should be taken with the baits, and they should not be allowed to lie about for an indefinite length of time.

MOUNT BARKER (Average annual rainfall, 30.93in.). January 19th.—Present: 30 members.

MIXED FARMING.—Mr. D. G. L. Dumfries contributed a paper on this subject. He said that experience had shown beyond doubt that it was very risky, if not disastrous, to rely solely on wheatgrowing. He favored a rotation consisting of wheat the first year, peas the next, followed by rape and mustard or some other such crop. By adopting this rotation the farmer was almost sure of securing excellent returns from the first two mentioned, and the latter, of course, was a catch crop. If it turned out well money could be made by fattening lambs: even if the crop was not very successful, the soil was enriched and cleaned by the sheep, and abundantly refreshed for the wheat crop following in the next year. Stable manure should be carefully conserved for application to the land. A few sheep could be kept right through the year, independently of the number that could be fattened off the stubble; peas or other crops could be grown specially for them. A few cows were also essential. It was just as easy to look after four or five as it was to attend to two. By keeping the larger number fresh milk, cream, and butter were always available, and any surplus could be disposed of to advantage. By keeping the number of

cows suggested it should be possible to keep three sows which would give, if properly looked after, five litters each in two years, or 20 pigs per year, and even if sold at an average of 10s. per head at six weeks old, would return £10 per sow per year. The sows would live and thrive on skim milk with very little other food added. Suckers at six weeks old well grown would at the present time easily realise 25s. He favored the pure Berkshire or the Berkshire-Middle Yorkshire cross, preferably the latter, as they grew faster and longer, and made better pigs for bacon. Poultry, too, should have a place on the farm. Leghorns were to be recommended for laying puropses. Eggs should be sent to the grocer while fresh. A patch of lucerne should be sown in September, and maize, mangolds and vegetables and fruit trees should also be grown. A very interesting and instructive conversational discussion took place after the paper had been read, and members touched upon most of the features of farming, and gave the meeting the benefit of their experiences in various directions.

STRATHALBYN (Average annual rainfall, 19.28in.). February 15th.—Present: 26 members and two visitors.

Mr. H. Follett repeated his paper on manures, and by the use of a blackboard showed the relative values per unit of the different grades of superphosphates, the costlier supers. being the more profitable and cheaper to buy. It was only by experiment that a farmer could ascertain which was the best and the quantity to sow per acre. Mr. Beviss tabled a sample of White Tuscan wheat badly affected with smut; the same had been pickled, but the opinion was that the seed had been badly infected when sown.

BLACKWOOD, January 17th.—Eight members and one visitor made an inspection of the State Experiment Orchard at Coromandel Valley.

LONGWOOD, February 19th.—The meeting was held at the homestead of Mr. J. C. Blakely. Samples of Japanese millet were inspected; the first a growth of 18in. without irrigation, the second, 2ft. 6in., with one watering, and the third a growth of 6ft. with two waterings. Samples of potatoes—Carmen and White Prolific, were also tabled. The Hon. Secretary (Mr. J. R. Coles) reported on the visit recently made to the Mylor Type Orchard.

MILANG, February 12th.—An instructive paper on "Manures," written by Mr. H. Follett, was read; it was much appreciated by members.

MOUNT COMPASS, February 19th.—The Hon. Secretary (Mr. S. Simons) read from the *Journal* the report of the Chairman (Mr. R. Peters) on results obtained from poultry during the past 12 months, and Mr. Peters answered a number of questions put by members.

PORT ELLIOT, February 19th.—Mr. C. H. Beaumont (Inspector of Orchards) answered a number of questions relating to fruit and vegetable growing, and delivered a short address on the drying of fruits.

STRATHALBYN, March 14th.—Mr. Cumming read a paper on the subject of making the best use of small paddocks, and tabled samples of potatoes and maize; the samples were taken from a piece of ground which had grown green feed, also a ton of hay to the acre cut in September, and which had immediately afterwards been sown to maize and potatoes.

SOUTH-EAST DISTRICT'

FRANCES (Average annual rainfall, 20.74in.).

March 18th.-Present: seven members.

Fox Pest.—Mr. A. J. Carracher instituted a discussion on the necessity for immediate action by land and sheep holders for the destruction of foxes. He pointed out the serious menace they were to at least one of the staple industries of the district. As soon as lambing started it was too late to lay poison, and he urged instant action. Mr. Barrett had secured best results by laying poisoned parrots for the foxes. On the motion of Mr. Krahnert, seconded by Mr. A. J. Carracher, it was unanimously resolved to ask all sheep and land holders in the

district to join in a crusade for the simultaneous destruction of foxes during the Mr. Carracher introduced a discussion on the whole of the first week in April. spread of stinkwort, and emphasised the need of getting rid of it before it overran the district. It was generally agreed that burning, where practicable, was the best means of getting rid of the weed.

KYBYBOLITE (Average annual rainfall, 22in.). March 16th.—Present: five members.

LAMB RAISING.—In a paper Mr. E. C. H. Schinckel said the war had caused extremely high prices to prevail for wool and meat, and owing to the disorganised state of affairs in most of the European countries, there seemed every probability of prices maintaining their high level for years. Hence a great opportunity presented itself to every man on the land. In the wool industry there were two distinct classes of wool sought after-Merino and Crossbred. At present the demand was in favor of the latter, owing to its being more serviceable for khaki. But this demand was only temporary, and it seemed reasonable to suppose that when the war was over the demand would divert strongly in favor of the finer Merino wool, as it was this class of wool that was most in demand in peace times. Viewing the subject from the meat standpoint the crossbred was the more suitable, the Lincoln-Merino being about the best lamb for the trade. Whether breeding for wool or for the meat trade, to make lamb raising profitable two points must be aimed athigh percentage and quality. To obtain the former the rams should be strong and vigorous, while the ewes, too, should be in fresh condition, and when mating, the flock should be kept on good feed and water. About six or seven weeks before the lambs were due the ewes should be crutched. This prevented the sheep becoming stained and dirty, and if done properly there would be little danger of the fly trouble. During lambing every attention should be given the ewes. They should be carefully looked through every day There was only one way of securing quality in the sheep, and that was by using pure-bred rams of one type and cutting out the inferior ewes. A growing crop of oats was one of the best and cheapest foods for ewes lambing. Oats thrived in the district, even if the seed were only cultivated in, and three ewes to the acre could be lambed on a crop of oats after it had become established, say six to eight weeks after germination. The lamb for the market, which should be dropped about August, would require "topping up," and the very best fodder for that purpose was peas, which also grew well in the district. was undoubtedly a great future for the producer in this direction, and in face of the country's needs it was the duty of every man on the land to endeavor to secure the maximum production from his holding.

MOUNT GAMBIER (Average annual rainfall, 32in.).

March 11th.—Present: 16 members.

SHORTAGE OF CATTLE.—The Hon. J. Botterill, M.L.C., gave an address on this subject. He said that the drought, together with the increase in consumption of meat, was mainly responsible for the present shortage of cattle. He had examined statistics in regard to cattle sales at Adelaide, and they indicated that the meat consumption of the present day was very considerably greater than it was 14 or 15 years ago. A few years ago bullocks could be purchased for fattening, but to-day there were none available. They were forced to buy three-year-old or four-year-old steers, that a fattener would not care to buy. This showed that before the drought there were factors existing to cause a shortage. Another reason for the scarcity was that a number of owners, farmers, and others had given up breeding. A principal reason for this was that they found it more profitable to buy young stuff, and let them grow for a year or two, when they would be worth more money, or would be fit to fatten. Another cause of the shortage was the action of the dairymen in killing all the calves except a few heifer calves. They might not do so to-day, perhaps, because of the scarcity, but formerly they did. The fact that a large number of large estates had been broken up and populated by dairymen had reduced the number of cattle in the country. People were apt to think there was greater profit in dealing than in breeding. That might be the case sometimes, but there came a time, like the present, when the breeder met with the greatest success. At the present juncture it behaved everyone who could to breed cattle. There was the greatest possible difficulty in getting suitable females,

and in view of that and the shortage of stock, he would say, "Breed from almost anything'; but good bulls were procurable at a price, and it would pay anyone to go in for a good bull. Even if the price should be twenty guineas or thirty guineas he was satisfied it would pay if the man put his stock into the Anyone must be struck by the great excess in value of pure-bred market. animals over mongrels. He hoped they would see a number of people breeding cattle, so that the shortage would be made up as soon as possible. would take some years to do that, but he hoped people who had suitable land would increase their herds, so that a large number of cattle would before long Mr. G. H. Kilsby said that one thing that struck him in become available. visiting different saleyards was the waste that was going on. There were many immature cattle killed, and that would tend to bring about a shortage of stock. His idea was to breed a general utility beast, and to that end he suggested the dairy Shorthorns. They were good dairy animals, and also good general utility beasts. To his mind it showed a great economic loss that so much young stock was sent to the markets, and that so many miserable mongrel bulls were kept. It would pay them to purchase good bulls. He believed the time had arrived when they must breed for size in everything. The day for small sheep was past, and so it was for cattle. By breeding in the right way they would assist their country. Mr. E. F. Crouch said it would be wise for their dairy factory companies to purchase good bulls for the beneût of their milk suppliers. A company could always arrange with one of its suppliers to keep the bull, and make a small charge for the use of him. When it had the bull two or three years it could exchange him with another company for its bull. He approved of the idea of breeding cattle that would serve the dual purpose of the dairy and the butcher. Mr. A. A. Kilsby thought one of the most important steps that should be taken was to protect the well-bred heifers from going into the slaughter yards at the present time. He thought measures of some kind should be taken to protect young well-bred heifers for a year or two. Mr. C. T. Major thought the shortage of cattle that existed should be a lesson to owners to breed the best. He was sure the best would always come out on top. He thought the milking Shorthorn was as good a breed as they could have, if they wanted milk and beef also. Mr. D. A. Collins questioned whether the present high prices of stock were going to continue. If they were, they must adopt different methods of fattening. It would never pay to buy threeyear-old or four-year-old beasts and turn them out into the paddocks to fatten. They must fatten them artificially, as they did in the old country. He would sooner pay a good deal more for a well-bred beast than buy a mongrel. He thought it would pay those possessing fairly large herds of dairy cows to go in for bulls of Shorthorn strain. Mr. McCormick said that on small blocks, like those of Moorak, he did not think it was going to pay dairymen to keep calves, unless they were to continue to get prices like those now ruling for them when they were three or four years old. A chief cause of the production of mongrels was that they were not fed properly nor rightly looked after when they were young. They were fed on whey and other stuff like that until they were three months or four months old, and they were starved until they were 18 months old. On stations the calves were fed on their mothers' milk until they were well grown and strong. Mr. J. Watson did not think they could reasonably look for beef cattle in dairy herds. The owners could not afford to keep the calves. He believed that unless they fed their calves well till they came to maturity they would not be much good. He considered there should be a wide distinction between the dairyman's herd and the fattener's herd. Each should have the kind of stock suited to his interests. The dairyman should have a good herd of a milking breed.

PENOLA (Average annual rainfall, 26.78in.).

November 15th.—Present: eight members.

The Hon. Secretary (Mr. Ockley) contributed the following paper dealing with the keeping of cows for butter production on light land:—'Light, sandy loam country, on which the Jersey is the most profitable breed, possesses several advantages over heavier and richer lands for the production of butter, not the least being that on the poorer lands it is imperative to grow almost all the food for the cattle, and not be lured to always put confidence in the natural herbage of the richer; and

although the easiest and most payable way to conduct dairying is through the medium of grass, still light land, on account of its porosity in winter and moistureholding properties in summer, can be managed so that the cows are gathering their No animal takes so long to recover from effects of own feed most of the year. anything approaching starvation as a cow, and if she comes in while feed is scarce she will rarely reach her possible yield when it becomes plentiful. A large quantity of cheap rough material is required to feed with the more valuable milk-making foods, such as grain, lucerne, hay, and bran. To supply this bulk food, maize is very suitable from February till June; green oats and rye from June to September; and then the natural herbage meets all requirements till the end of the year. Ninety-day maize, planted in September in rows about 3ft. apart, using about 10lbs. of seed per acre, with the addition of 1cwt. super., will be ready by February 1st; while Eclipse maize, planted in October, will be ready by the end of February. Maize should never be fed till the cob is formed; then a barbed wire can be erected across a portion, and the cows allowed to help themselves. It is necessary to supply richer foods, either oats or bran, with maize, which does not improve a cow's milk a great deal. For cheapness maize and oaten hay give good yields. Oats or rye should be drilled in in March; they can be sown on land from which the 90-day Oats or rye maize has been removed, and it is not necessary to plough the ground for it, as if that be done the stumps of maize will prove a nuisance on the surface, whereas, if the ground is only sufficiently loose to cover the seed, the oats and rye will thrive and ordinarily will be high enough for the cattle by the time the last of the Eclipse maize is finished, which should be about June. As each plot of maize is eaten, more oats should be drilled in if the ground has not become too weedy. Cattle are more fond of green rye than of oats, and although it taints the milk, it does Oaten hay can be profitably fed until September in most not affect the butter. years. After a few years of cultivation the land will become covered with different clovers, which are without doubt the most profitable to the dairy man, whose hardest work occurs when the cows have to be hand fed, as their aggressive nature demands that each one should be isolated; if oaten hay be used only when the pastures are slack, it can be fed to the cattle on the ground, thus saving the building of stalls and racks and the work entailed in cleaning them up. The following points require strict attention, viz.:—Don't leave the bull with the herd, lest the cows should get in calf before they have been in milk three months, which makes their period of lactation too short. Keep records of each cow's yield and test It is not easy to make good butter on a farm, and moreover, it does not pay because the prices obtained for butter show that factory-made commands more than that sent direct from the farm. If the milking sheds and cow yards be placed on a sandy, porous site, it will be found that such ground absorbs the unpleasant odors to an appreciable extent. Have sufficient maize to last until the end of May, and give one sheaf of hay per day to each cow while on maize. Be sure to drill in oats and rye with the first autumn rain so that they will be ready for grazing when the maize is finished, because the object aimed at is to keep the stock off the pastures (a portion of which will pay handsomely to be top dressed with basic slag or similar acid soluble super. every year) as long as possible until spring, since on light country, young grass will not recover readily after being eaten down, whereas, if left till September the clovers will have had a chance and stand heavy stocking. Then plough the ground for maize before the winter's moisture has evaporated." Discussion.—Mr. Norman said that a cow's butter fat Discussion.—Mr. Norman said that a cow's butter fat tested a higher per cent. while her milk yield was low than when she was in her Mr. Ricketts said that his experience last year was that directly the maize supply was finished the cows' yield diminished appreciably, although extra chaff was substituted. Mr. Lampe explained how, through cutting and chaffing maize, although it was left for several weeks to dry, it went sour and was unfit for use.

TATIARA (Average annual rainfall, 19in.). February 12th.—Present: 11 members.

POULTRY.—The Hon. Secretary (Mr. L. Stanton) contributed the following paper on this subject:—''Poultry is kept on most farms, so I just propose making a few suggestions that may be of benefit to those interested. The first attention should be given to the laying hens, and only the best layers of any particular strain should be kept; they should be tested, and only the best of these bred from. This can best be done by having say six testing pens, which can cheaply be made of wire-netting, providing single pens for each hen. There is not the least doubt that a large

number of unprofitable hens are kept of the best laying strain. Hens should not be bred from until they are two years of age. Roosters should be active, and of a good laying strain. Early chicks should be secured. The first should be hatched in July, and if a fair number of fowls are required, an incubator should be acquired for the early hatching. Chicks hatched at that time should be in full laying through the succeeding winter, when the eggs are at a high price. Chickens from the incubator are easily reared if properly fed, watered, and kept dry and warm. I have not suggested the keeping of any particular breed of fowls, as this is a natter for each person to decide."

TINTINARA (Average annual rainfall, 18.78in.). February 26th.—Present: nine members.

Mr. T. Kennedy contributed the following paper on the "Selection of Mare for Breeding, and her Treatment Whilst in Foal":—"This subject requires careful attention amongst farmers. The first consideration is the selection of a suitable She should be of square build, and well proportioned, good tempered and staunch, for as much depends on the character of the dam as on that of A long "slabby" and leggy mare should be mated to a low-set and I prefer the mare to have a slight strain of blood in her. compact sire. ensures her being a better mover than the pure Clydesdale. This mare mated to a Clydesdale sire would give the two qualities most essential for heavy and sandy districts, namely, strength and pace. I would advise mating young Clydesdale mares to a blood sire, thus securing a good serviceable cart or trolly beast. This practice would make it much easier for the young mare at foaling. The next point to be considered is the selection of the sire. The horse to patronise is the farm-bred horse and a worker, as his stock are generally healthier than those of the horse kept in a loosebox or small yard from season to season. He is also a surer foal-getter. I consider it a mistake for farmers to send their mares away to the service of a horse, as they not only lose the use of them during the season, but they take the risk of having them crippled by other horses running in a strange paddock. A mare should not be over fat for breeding purposes, and is more easily stinted after a hard day's work. Whilst a mare is carrying a foal she should be kept in good condition and kept at steady, constant work; but one should avoid putting her between shafts and keep her out of a stump-jump plough when breaking up new land. If forced to use her, one might put her in a disk plough or cultivator, where they do not get hung in the stumps. In any case care should ing up new land. be taken in turning, and the mare worked on the outside of the team, or as near the outside as possible, to prevent her being bumped by the other horses whilst She should have at least from three to five days' rest before, and from eight to 14 days after, foaling. From my own experience it has certainly paid me to breed young horses in this district. During the past eight years I have raised from three mares and their offspring, from 14 to 16 colts and fillies, thus keeping my young stock on the farm during all that period. I should advise keeping mares in a small paddock when near foaling, for if they are running in a paddock with other horses the foal is liable to be crippled or killed. Should a man think breeding worth while, he must be prepared to give his mares attention at the critical time, and in all probability he may have to lose a night or two's sleep in order to save a mare he values. If a man is watching carefully at the time of foaling and anything should go wrong, he can save perhaps both mare and foal. Plenty of oil should be used, and the mare assisted when the pains commence, but never too forcefully. Rather force the foal back than pull while the mare is not straining. After foaling hot bran mashes containing a strong stimulant should be administered. The mare should be syringed out well with warm water and soda as an antiseptic. Should the foal seem exhausted after one has had trouble in taking it from the mare one should not hesitate to take a few drops of blood from the navel and place it on the foal's tongue. This may save

NARACOORTE, February 23rd.—The Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) gave a demonstration in the afternoon, and in the evening lectured to an audience of 50 persons on the subject of "Mares Foaling."

TATIARA, March 4th.—Mr. W. Campbell read a paper on the "Wheat Bag System."

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Minister of Agriculture.

POINTS FOR PRODUCERS.

River Murray Branches Conference,

The second annual conference of Branches of the Agricultural Bureau situated on the River Murray is to be held at Murray Bridge this month. On Wednesday, May 17th, a field trial of implements will be held at Mypolonga, to which place delegates and visitors will be conveyed by launches provided by the Director of Irrigation. At 8 p.m. the conference will be opened by the Minister of Agriculture (Hon. C. Goode, M.P.), and a paper read by Mr. Lane, of the Murray Bridge Branch. On Thursday, 18th, at 10.30, the Dairy Expert (Mr. P. H. Suter) will address the conference on "Dairying on swamp areas," and Mr. A. E. Ross, of the Waikerie Branch, will read a paper on "The marketing of fruit." The afternoon session, which begins at 2 o'clock, will be taken up by the Wool Instructor (Mr. Henshaw Jackson), who will deal with the question of feeding sheep on smaller areas, and the Director of Irrigation, who will read a paper on "Cooperation."

In the evening the Director of Agriculture (Professor Arthur J. Perkins) will contribute an address on "Salts injurious to vegetation, and their connection with irrigation," which will be followed by a "Free Parliament." As usual, all sessions will be open to the public.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh dourine (or equine syphilis), equine fever, epizootic lymphangitis, farcy, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

"H. P. McC.," Carpa, reports that horses a year after strangles still have open wounds and discharge stinking matter, although quite healthy.

there is a hard lump on jaw.

Reply—Health is no doubt a relative term, but to say horses that are scattering strangles streptococci broadcast are healthy is not quite correct. This trouble was mentioned by the Veterinary Lecturer when at Cowell, and when they are attacked with strangles the abscess should be lanced when it is ripe, and this trouble will be avoided. To treat it, occasionally dust a little powder sheep dip, such as Cooper's, on the opening. The large glands mentioned will probably have to be blistered with a little red blister made of 1 dram biniodide of mercury and 7 drams lard. A report of progress after a month's treatment will be esteemed.

"R. D. G.," Port Broughton, reports (a) foal just weaned very full under jaw and seems to have a fit, cough, and discharge from nose, stiff in all legs, soft lump

outside hock; (b) colt, four years, with soft pulpy swellings inside hocks.

Reply—(a) The foal is suffering from a form of pyzmia, and recovery is not likely, or, if it occurs, not satisfactory; if treatment is desired, lance the swellings on hocks and under jaw and treat with spirit of iodine, give a teaspoon of the same internally twice or three times a day in a little molasses smeared on the teeth. (b) The swellings are known as bog spavins, and are distensions of oilsaes; as the colt grows older they may disappear. It would be well to rub them daily with some lotion made of loz. tr. arnica to 1 pint meth. spirits.

"E. W. C.," Kingston-on-Murray, reports that a mare came in from paddock lame, with foot swollen above hoof (where ringbone comes), but only on outside; an

old scar was visible on swelling, but healed.

Reply—It is most likely that there is still a stub in the swelling, and it would be advisable to blister the part well with biniodide of mercury 1 dram, to lard loz., using half. This will probably cause the scar to break out again, when it should be probed for a stub, which must be removed, and the part dressed with Stockholm tar. A damaged bone will also produce the same symptoms, and the absence of a stub would point to this being the case.

"J. H. W.," Lowalde, has a mare, eight years, five months in foal, which has

dropped a good deal, and has blood on tail every morning.

Reply—It is almost to be feared that she has slipped her foal; another possibility is that she was carrying twins, and has slipped one. It would be well to give her light regular work, which is difficult in the mallee, and if there is too much risk of jerks, it would be better not to work her. Give 10 drops of tr. pulsatilla morning and evening on the tongue for three weeks, and kindly report again.

"E. A. P.," Avon, states that ewes in lamb, eating stinkwort, get shaky in legs, fall, and die.

Reply—The stinkwort is not altogether to blame, though it does some of the mischief; the root of the trouble is a microscopic parasite in the blood called sarcosporidia. The best way of combating the trouble is to constantly change the paddock,

not letting the sheep stay more than three days at a time on one, and allowing at least nine days before they come back to the same. It is difficult to give medicine to in-lamb ewes, but if a tin of Cooper's worm tablets are obtained from any agent for that firm's dip, and two tablets are given daily to the staggery ewes for three days, they will probably recover. When very bad bleeding by cutting through the eye vein will help, and this may be done to advantage even in the milder cases. It is difficult to burn stinkwort, but it is of value to the ground ploughed in.

"S. V.," Brentwood, has a heifer, three years, six months in calf, hind leg broken

4in. above hock.

Reply—Slinging, under the circumstances, is not advisable. It is not stated whether the fracture is simple or compound; in the latter case there is a skin wound also, which should be dressed daily with spirit of iodine, a window being left in the setting for the purpose. A practical way of splinting will be to apply warm pitch and wind hessian or bran bag round, applying pitch at each turn, till a firm coating of, say, ½in. thickness is obtained; the outer coat of pitch may be sanded to stiffen it. If setting is decided on, see that the ends of the bone are in their right place before commencing; the heifer should be given a comfortable bed, and turned gently from side to side at least once a day, and when inclined to get up later on should be helped. A later report will be esteemed, but the writer's opinion is that slaughter would be the most economical treatment.

"H. A. R.," Greenlees, Monarto South, had a colt stubbed three weeks ago in frog, broken out at heel, matter discharging, pain, irritation, and inflammation, oily

matter, and offensive smell.

Reply—The best treatment at the start of such cases is to pare out well where the stub entered, then to pour in turpentine or benzine, and to poultice well for some days, when feasible, with bran and linseed meal, and then to dress the place twice daily with spirit of iodine. The best diet when obtainable is green paddock feed, or, failing this, plenty of bran and a little long hay. It is to be feared in this case that the navicular joint is affected, and possibly a splinter of stub still in foot, so it would be well to thoroughly pare out and search the wound; then poultice as suggested, and afterwards to dress the heel with a dusting of chlorinated lime and a top dressing of Venice turpentine; this should be done daily. A further report in about 10 days will be esteemed.

"A. B.," Coorabie, reports the occurrence of cotton balls in lamb.

Reply—Eleven balls as big as a cotton reel is not an extraordinary number. They are caused by the felting of indigestible cellulose, such as seeds, &c., brought about by the churning movement of the paunch, and often reach the size of cricket balls or larger; they do cause death by actual stoppage. It is quite possible the lamb's spitefulness was due to indigestion, caused by these calculi. They are often passed, and may be found about the paddock when not larger than these.

"T. S.," New Well, had a cow, calved in September, with one blind teat; second calf in February, went right off milk, and recovered; went down, but got up again,

and is only staggery now.

Reply—The blind teat was due to mammitis. Going off milk was caused by disease, and the other symptoms point to dry bible. A lick of 1 part saltpetre and 4 parts bonemeal would do her good; if she will not take it as a lick, she might have a handful scattered over her feed once or twice a day for a month or so. She would be better for one drench, as follows, in addition:—Epsom salts, 11b., sulphur 202s., ginger 102., warm beer 1 quart.

"M. W.," Moorlands, has a horse with frogs and soles soft.

Reply—The affection is canker of the sole, which is most difficult for an amateur to treat. Pare the heels down well, so as to get as much pressure on the frog and sole as possible; cut away the soft parts vigorously, then treat daily as follows:—Dress the parts with a few drops of pure beechwood creosote, and as soon as this has dried put a paste made of equal parts arsenical sheep dip (Cooper's) and K.I. eucalyptus residue tar. Give internally twice a day for a month two tablespoons of Fowler's solution of arsenic in feed. Kindly report progress in a month.

"A. W.," Moorundie, Narridy, has a chestnut draught mare, eight years, in foal for first time, seven months gone, discharges clots of blood as big as a pigeon's egg with urine; no pain.

Reply—The condition is not uncommon under such circumstances. The probability is that the mare will carry her foal to term, but she may east it before. A

little light work in the team would be beneficial to the mare, if regular, otherwise she would be better in the paddock. Ten drops of tr. secale cornutum morning and evening each alternate week should be of benefit as long as there is the discharge.

"W. J. A.," Stansbury, colt and filly, 18 months, their dung is undigested, and

they are always licking salt and dirt, and though well fed, lose condition.

Reply—Worms are at the bottom of the mischief. Give daily in feed a table-spoon of the following powder for a fortnight, and then kindly report progress:—Salt 1lb., sugar 1lb., linseed meal 1lb., and ½lb. each sulphur, resin, antimony tartrate, native quinine. Also give a handful of sunflower leaves once daily.

"N. T. W.," Mount Wedge, reports draught chestnut mare, 16 years, with swelling

under belly for a year, still discharging.

Reply—The swelling is due to an abscess, probably caused by a piece of bone or a stub that has penetrated into the loose tissue. She would probably carry a foal all right, and the trouble may work off while so doing; in the meantime hot fomentations and a careful watch for a harder swelling, where the source of the trouble may be.

"A. F. Y.," Port Broughton, has a mare, three years, white skin half covers eyeball, no sign of inflammation, little watery discharge; very fidgetty; has been

running in stubble.

Reply—The skin is in, not on, the eye, as often mentioned. It is a sign of inflammation, and results in this case from an injury. The simplest way to treat it will be to break the filly into wearing a headstall, and then hang over the eye from the forehead band to cheek band a piece of cloth, and keep it damp with a mixture made of loz. tr. arnica and $\frac{1}{2}$ pint each of meth. spirits and water. The eye will most probably slowly clear.

Information has also been sought by and supplied to the following:—''F. R. G.,'' Keith; ''W. T. B.,'' Eurelia; Yeelanna Agricultural Bureau; ''J. B.,'' Halidon; ''W. N.,'' Glencoe; Yadnarie Agricultural Bureau; ''A. H.,'' Kulde; ''A. B.,'' MacGillivray; Bowhill Agricultural Bureau; ''J. W. R.,'' Bute; ''W. G. S','' Yabmana; ''H. E. B.,'' Echunga; ''J. H. C.,'' White's Flat; ''E. W.,'' Keith; ''F. N.,'' Meadows; ''G. C.,'' Melrose; ''T. McE.,'' Miltalie; ''S. T. A.,'' Barunga; ''T. W. L.,'' Maitland; ''D. E. McL.,'' Robe; ''W. F. S.,'' Naracoorte; Beetaloo Valley Agricultural Bureau; ''E. E. D.,'' Lameroo; Elbow Hill Agricultural Bureau; ''A. H. W.,'' Belalie North; ''W. L.,'' Salt Creek; Myrla Agricultural Bureau; ''D. P.,'' Naracoorte; ''G. E.,'' Meadows South; ''F. C.,'' Wirrabara; ''P. S. G.,'' Lower Light; ''G. B.,'' Kingscote.

HORTICULTURAL INQUIRIES.

[Replies supplied by the Horticultural Instructor, Mr. Geo. QUINN.]

"C. H. W.,"—The apple sent is affected by what is commonly known amongst fruitgrowers as "glassy" or "water" core, although it is not always confined to the region of the core. It is found in certain apples, usually when they are produced on young, vigorous trees. Amongst the sorts whose fruits are most commonly affected here are:—Dumelow's Seedling, Stone Pippin, Ribston Pippin, and Jonathan. The defect has been investigated by mycologists in many parts of the world. Their explanations state it is due to the cell sap becoming diffused through the cell walls into the inter-cellular air spaces, until the whole area of tissue is brought to a common condition of saturation. For this to be made possible the vitally controlled functions of the cell walls appear to have been broken down, so that their resistance becomes only a physical or mechanical one. Most of the investigators attribute the beginning of this disorganisation to an over-gorged condition, caused by an excess of crude sap being thrust into the conducting sap vessels, and thence into the cells. No remedy is suggested, as usually, on reaching the staid growth accompanying maturity, the trees produce normal fruits, excepting where special stimulation causes a recurrence of great vigor, which is in turn transmitted to the fruit.

"A. D. M." seeks information with respect to storing lemons.

Reply—The fruits should be cut from the trees when they are fully grown and showing only a tinge of yellow. This is during July or August in most parts of this State. The skins must not be pricked in handling, and not enough of the fruit stalk left on to prick a wound in other fruits in the cases. The lemons should be stood in a dry place, subject to a moderate draught, for a week or fortnight, as the

weather decides. This is to toughen the rind prior to storing, and the space of time usually permits faulty, damaged specimens to become detectable. The fruits are then best stored in an underground store in shallow trays or boxes, not holding more than two or three layers of fruit. It is necessary to be able to regulate the admission of air, as too much dry air shrivels the skins as the summer comes on. Sometimes it is necessary to sprinkle the floor with water very sparingly to increase the humidity and prevent shrivelling. This, however, is a matter of judgment, according to season and other conditions.

POULTRY INQUIRIES.

[Replies supplied by Mr. D. F. LAURIE, Poultry Expert.]

Beetaloo Valley Agricultural Bureau desire information in respect to the feeding of incubated chicks.

Reply—At Parafield the chickens are fed on cracked wheat (pin-head size for first week); then, if obtainable, hulled oats (cracked) are added. This is fed in cocky chaff, to promote exercise by scratching. In addition, dry mash is used. This is made of 1 part bran, 2 parts pollard, and 2 parts ground wheat, and a sprinkling (about 2 per cent.) meat meal. Supply in a tin dish, with wire netting top to prevent the chickens scratching the meal out of the dish. Keep this always available

"L. A. W.," Streaky Bay, reports the death of chicks.

Reply—As you mention lice, the probability is that they are the cause of the mortality you mention. Several species of lice infest poultry. Those which run about the body (Menopons) are generally scurf eaters, and, if numerous, will cause death. Another species (Lipeurus) is found attached to the head (back or under lower jaw); they are grey in color, are blood suckers, and cause great mortality. Treatment—Mix 1 part kerosine in 6 parts olive oil or lard, and rub a little into the skin of the head, &c., and a touch under the wings and round the vent. This should be done periodically.

"A. B." desires to know the ages at which geese should be mated.

Reply—Geese are not matured until the second season—that is, approximately, two
years old—and should not be bred from until then. If good, they may be retained
as breeders for several years.

IMPORTS AND EXPORTS OF PLANTS, FRUITS, ETC.

During the month of March, 1916, 523bush, of fresh fruits, 2,537bush, of bananas, 11,556 bags of potatoes, 682 bags of onions, and 94 packages of plants, trees, and bulbs were examined and admitted at Adelaide and Port Adelaide, under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 16bush, of bananas (over ripe) were destroyed. Under the Federal Commerce Act 67,730 cases of fresh fruit and 5 packages of dried fruit were exported to oversea markets during the same period. These were distributed as follows:—For London, 6,596 cases apples, 1,134 cases pears, and 5 packages of dried fruit. Under the Federal Quarantine Act 2,835 packages of seeds, plants, bulbs, &c., were examined and admitted from oversea markets.

During the month of April, 1916, 556bush. of fresh fruits, 4,208bush. of bananas, 17,588 bags of potatoes, 2,538 bags of onions, and 81 packages of plants, seeds, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 78bush. of bananas (over ripe) were destroyed, 30bush. oranges were fumigated, and 131 bags of potatoes from Victoria were rejected, on account of Irish blight. Under the Federal Quarantine Act 3,211 packages of seeds, plants, bulbs, &c., were examined and admitted from oversea sources. Of these 28lbs. turnip seed, and 1 case beet "balls" were cleaned of noxious weeds, &c., and 14lbs. of carrot seed were destroyed on account of low vitality. Under the Federal Commerce Act, 11,148 cases of fresh fruits and 5,878 packages of dried fruit were exported to oversea markets. These were consigned as follows:—For London, 9,976 cases apples, 202 cases pears, and 2,803 packages dried fruit; for South Africa, 3,075 packages dried fruit; for New Zealand, 20bush. lemons; for India and East, 950 cases apples.

ROTATION OF CROPS.

[An address delivered at the Conference of Lower Northern Branches of the Agricultural Bureau, 1916, by Arthur J. Perkins, Director of Agriculture.]

Introductory.

I have been asked by the committee responsible for this Conference to address you on "Rotation of Crops, and the Profitableness of the Practice for the District." In this choice of subject, I recognise the hand of my old friend and colleague, Mr. A. M. Dawkins, to whose stanch support and consistent encouragement I owe much of the success of my public career. "Rotation of crops," or perhaps I should say, greater diversity in cropping, is one of those important points which Mr. Dawkins has always had at heart; and in my reasoned treatment of the subject to-day, I should be very loath to disappoint him. I have a presentiment, however, that my final conclusions may not take the direction he altogether anticipates.

DEFINITIONS.

In the interests of "clear thinking" it is necessary that we should begin with a definition of terms. In its original meaning "rotation of crops" may be described as the order in which two or more crops, different in type, are made to succeed one another in regular sequence, year after year, in the same field.

There are two essential facts which such a definition would appear to imply. Firstly, the settled practice of growing more than one type of crop on the farm; and secondly, the fact that these crops must follow one another on the same land, not indiscriminately, but in a regular cycle that experience has predetermined.

Broadly speaking, therefore, "rotation of crops" governs the system of farming practised in any locality; and if the definition given is to be rigidly interpreted, it cannot be made to include any system of farming in which one type of crop alone is grown. Such an interpretation, however, would be both inconvenient and illogical; nor, indeed, is it customary to adhere to it. Hence, in a wider sense, "rotation" has come to mean the special order in which in any circumstances land is cultivated. And from this point of view the farmer of the Gawler Plains, whose land is in alternate years treated as bare fallow, or put

under wheat, practices rotation quite as much as any tarmer in the eastern counties of England, handling a far wider range of crops.

Nevertheless, it must be recognised that "rotation" usually implies diversity in cropping; and I am rather inclined to think that those who have asked me to speak on the subject are interested to a greater degree in attempts to diversify our cropping than in other theoretic aspects of rotation. And undoubtedly they would be right were such a change at all practicable. The advantages of varied cropping are many, and are frequently quoted in support of the rotation of crops, in its narrower sense. Some of these advantages I propose reviewing briefly.

SOME ADVANTAGES OF VARIED CROPPING.

It has become an axiom in agriculture—as old as tillage itself, one might almost say—that a crop does not show to great advantage when sown on land which in the season immediately preceding has just borne a similar crop; that wheat, for example, does not follow wheat to advantage; or clover clover; and so on. This is a matter of common observation; and by none is this view more tenaciously held than by capable market gardeners, whose relatively small areas render them, as a rule, in such matters more reliable observers than the average farmer. It used to be said that by some sort of root excretions plants poisoned the soil for plants similar in kind which happened to follow them. This statement has been controverted-indeed, vigorously denied by plant physiologists—and the experiments of Lawes and Gilbert, during the course of which wheat was successfully made to grow on the same land for over 60 successive years, are frequently quoted against it. cently, however, American chemists claim to have extracted from the soil excreted substances having a toxic action on plants similar in kind to those from which these substances were originally derived. Indeed. although Lawes and Gilbert were quite successful in the continuous growing of wheat on the same land, they failed with both leguminous crops such as beans and clover, and root crops such as turnips and mangolds; and without being able to put forward an altogether satisfactory explanation of these failures. In practice, however, unless we happen to be aiming at its counter action, we are more interested in the fact than in the predetermining cause. And the fact, I think, we must admit; indeed it is not difficult to find evidence of it all around us. Take. for example, the herbage that springs up spontaneously in fields left out of cultivation. A Cape weed year will be followed by a barley grass year, and that again by a year in which the so-called native clovers abound; it is rare, however, that the bulk of the herbage of a field is identical from year to year. Partly, no doubt, this is a consequence of seasonal differences; but partly, too, I believe, because no plant is

absolutely at home on the graves of its kindred. Hence both Nature and agricultural experience would appear to confirm the view that for most satisfactory results two crops, like in kind, should not follow in immediate succession one to the other.

This is an argument which tells strongly in favor of diversified cropping. It would, however, carry even greater weight if it could be shown that a second crop of the same kind and on the same ground presented little or no chances of success. And there are cases in which such is indeed the case. Red clover, for example because it is said, of an ill-defined clover sickness, cannot in England be grown successfully on the same land at shorter intervals than four years, and sometimes than eight years. Equally refractory to second crops of the same kind is land that has carried flax, and examples of the kind might be multiplied without difficulty. And although we know wheat and cereals generally to form exceptions in this particular direction, it does not follow that cereal crops separated one from the other by other crops different in kind are not under equal conditions superior to those grown in immediate succession one to the other.

But if, indeed, it be admitted that a crop does not as a rule thrive on the stubbles of its own kind experience shows that there are some crops that from the point of view of others different in kind that follow, have a distinctly improving influence on the general fertility of the soil. This has long been known to be the case with most leguminous crops, such as pease, beans, vetches, clovers, &c.; and so great is their indirect advantage in this direction, that were they not in themselves profit-earning, they would still be worth growing because of their favorable influence on cereal crops that follow. Hence the inclusion of crops of this kind in any form of rotation must always be looked upon as a distinct step forward in agricultural practice.

It is said, too, in favor of diversified cropping, that by separating crops like in kind one from the other by a period of time more or less long, liability to parasitic diseases is considerably reduced. This is a fact, the truth of which has been brought home to many a farmer. Takeall—or at all events that type of it induced by the wheat stem killer (Ophiobolus graminis)—is, as many know, readily controlled by slipping in an oat crop between two wheat crops. Indeed, it seems unnecessary to labor this point; if the seeds, germs, or spores of a parasite are left in the ground it seems reasonable to suppose that if the land be placed for the time being under some other crop not subject to the disease the parasite will perish for lack of a suitable host plant.

Again varied cropping means, as a rule, varied treatment of the soil, both as to tillage and manuring; and this, in practice is a very considerable advantage. We are all aware of the danger of the formation of

a hard sole-pan at the depth of ploughing adopted without change year after year in the preparation of the land for wheat. course of varied cropping, crops calling for shallow tillage are mingled with others that need deeper working, it is in the end all to the advantage of the general fertility and working condition of the soil. According to the type of crops grown tillage operations will take place at varying times of the year with varying and advantageous influence on the ultimate agricultural value of the land. Advantages of equal value attach to the use of manures which tend to vary with the type of crop Heavy organic manures, such as farmyard manures for example, are not liked for cereal crops under our climatic conditions, and yet they bring to the soil that precious material "humus," which we are burning up as fast as we can in our practice of bare fallow. But if the organic manures are dangerous in their application to grain crops they are invaluable for the growth of forage crops, to which they can always be applied with great advantage.

Another advantage of varied cropping is that it has the effect of spreading the several farming operations—preparation of the land, seeding, harvest, &c.—more uniformly over the year. Hence, with the same strength in staff and material a larger area can be handled without inconvenience, and gaps in the year when there is little or nothing to do disappear.

PRACTICAL DIFFICULTIES BEFORE THEORETIC ATTEMPTS AT CHANGES IN ROTATION.

These, then, are some of the more salient advantages that are generally claimed, not so much for rotation as for diversified cropping. whilst we may readily agree upon the theoretical soundness of these claims, we cannot bring them forward as irrefutable arguments in favor of diversified cropping for local purposes. The fact is that rotation of crops, or diversified cropping, is a topic admitting of easy academic treatment, but in practice exceedingly difficult of application Thus, we could not very well recommend a more to individual cases. diversified type of farming to the farmers of the more tertile portions of the Lower North, except on the tacit understanding that in the end both the State and the individual farmer would be the richer by the Now, this may or may not be the case; it is a question which I reserve for later discussion; but this much is certain, that the ultimate issues are very far from being dependent on the mere climatic adaptability of the crops recommended for the district in question. not forget that when in any country a definite type of rotation, or cropping. has been deliberately adopted by a great majority of farmers. it is because in that locality, and at that particular time in history, this system of handling land is the one which over a number of years

assures to the farmer the highest average net revenue. And there is always the danger that well-intended attempts to improve upon a system for which the circumstances of every day life are responsible may result in more damage than usually attends endeavors to paint the lily or refine fine gold.

Let us admit, therefore, that when important modifications in practice are involved, the question of rotation or diversified cropping is one of exceptional difficulty; that it raises, not cultural problems alone, but economic ones as well. And whilst it might be comparatively easy to demonstrate that quite a number of new crops might be made to grow successfully in any given district, the task is otherwise difficult when endeavors are made to show that these same crops dovetail into the economic conditions of the country. Hence, when in the matter of rotation, we undertake to upset what has long been settled practice, we are taking much on our shoulders; a task which only a novice would take up light-heartedly. And if we are to succeed, and carry home conviction to others, we must in the first place be overwhelmingly satisfied with the soundness of our premises.

MODERN PROGRESS OF NEW COUNTRIES VERY RAPID, AND MAY JUSTIFY PERIODICAL CHANGES IN FARMING.

These, then, are some of the difficulties that confront us; and if I have emphasised them it is not because I wish to infer that in local agricultural matters, "all's well in the best of all worlds." beyond dispute that economic conditions change from period to period; and a system of farming which at any given moment fits in admirably with the general scheme of things, may a few years later be hopelessly I am bound to admit, too, that nowadays recently settled countries progress far more rapidly than was the case in the good old Compare, for example, the progress made in the first hundred years of settlement in both North and South America with that which has obtained in this country over the same period of time. us, in particular, it is undoubtedly agricultural development which has rendered rapid general progress possible. This has in the past involved not only the clearance of virgin land, but also from time to time change in practice and adaptation to circumstances; so much so, that from the agricultural point of view, we may be said to have been living in a perpetual stage of transition. This fact, no doubt, accounts for the open mindedness of our farmers, and argues well for the future of more diversified cropping, should we succeed in justifying its claims to acceptance.

GROSS RETURNS IN COUNTIES ADELAIDE, GAWLER, LIGHT, AND STANIEY.

The most important factors, therefore, in changes such as we have in view, are of economic nature, and before forming any decided opinion

on the subject it seems important that we should ascertain the bearing of some of these. When, for example, it can be shown that any particular system of farming is gradually becoming unprofitable, there is some *prima facie* justification for changes that may be brought forward. Let us, therefore, endeavor to ascertain in the first place what have been the average gross returns from farming lands in the districts which you represent.

I understand that this Conference includes Branches of the Agricultural Bureau from Counties Adelaide, Gawler, Light, and Stanley; some of the most uniformly fertile areas in the State. Hence, my figures have reference to returns from these four Counties, and are summarised below in Table I.

Table I.—Showing Average Yearly Yields and their Values of Farming Land in Counties Adelaide, Gawler, Light, and Stanley (1909-1913).

Crops	Average Area.	Average Production Per Acre.	Total Production.	Average Value of Total Production.
	Acres.	Bush.	Bush.	£
Wheat	374,748	13.80 Tons.	5,374,538 Tons.	1,025,224
Hay	180,486	1·45 Bush.	257,489 Bush.	735,092
Barley	11,232	18.50	203,099	30,458
Oats	12,824	14.30	178,961	19,091
Pease	5,298	16.28	86,747	17,004
Green forage (cereal)	5,228			10,456
Green forage (lucerne)	2,535			10,140
Rye	104	14-07	1,468	237
Maize	51	13-29	525	90
Totals	592,506	_	_	£1,847,792

We see, therefore, that, exclusive of areas under vines, orchards, &c., the average yearly area under crop in the four counties between 1909 and 1913 was represented by 592,506 acres; and that the average gross value of produce raised yearly on this area was represented by £1,847,792, or £3 2s. 5d. per acre per annum. This last figure, although correctly expressing the average productiveness of the land under present conditions of working, is perhaps economically incorrect, inasmuch as it does not take into consideration an important area of land, not under crop it is true, but under bare fallow in anticipation of future cropping. The average area under bare fallow for the period of years that concerns us was 463,796 acres. This brings the total area of farm land under cultivation in any one year to 1,056,302 acres, and reduces

the average annual gross returns from land under cultivation in the four counties to £1 15s, per acre per annum.

NET RETURNS.

Now, whether this yearly return of £3 2s. 5d. per acre cropped, or £1 15s. per acre cultivated, is a good paying return, depends on a It depends, for example, very largely on the variety of conditions. average rental value of the land, and on the average cost of production. I do not suppose that in the districts you represent the average rental value of land can be put down at less than 10s. an acre, which would leave £1 5s. per acre to represent average cost of production and net profit over total area cultivated, or £2 2s. 5d. (assuming in view of the practice of bare fallow that each acre carries two years' rent) to represent average cost of production and net profit over total area under crop. Cost of production, exclusive of rent, is variously estimated at 25s. to 30s. an acre, and sometimes more. If we adopt the latter figure we have left for every acre under crop an average net profit of 12s. 5d., which, although not princely, may be taken to be sufficient when large areas are put under crop by individual farmers.

PRESENT LOCAL ROTATION.

Now it remains for us to determine the exact system of rotation followed to secure the returns indicated above. There is one point that I have not yet taken into consideration, and that is the area of land lying temporarily out of cultivation from year to year. For the period under consideration, i.e., 1909 to 1913, the area lying temporarily out of cultivation, and presumably grazed, averaged 431,168 acres; hence we may take it that between 1909 and 1913 the area actually farmed in the four counties was represented by 1,487,470 acres. The relation between areas under crop, under bare fallow, and out of cultivation is shown below in Table II.

Table II.—Showing Relation Between Areas under Crop, under Bare Fallow, and Out of Cultivation in Counties Adelaide, Gawler, Light, and Stanley (1909-1913).

Under crop	Areas. Acres. 592,506 463,796 431,168	Ratios to Total Areas. 39.83 31.18 28.99
Total area farmed	1,487,470	100.00
Under cereals	463,796	39.30 31.46 29.24
Total area assumed to be farmed for cereals	1,474,358	100.00

Thus, then, if we neglect crops other than cereals, which after all only represent a little over 2 per cent. of the area under crop the relations between the areas under crop, under bare fallow, and under land temporarily out of cultivation show very clearly that the following rotation is generally adhered to in four counties:—

First Year—Bare fallow	31.46 per cent.
Second Year—Cereal crop	39.30 per cent.
Third Year—Grazing	29.24 per cent.

And it is this particular form of rotation, together with about 2 per cent. of subsidiary crops, which have been responsible for the returns which have already been indicated. Are any changes possible, in present circumstances, which will lead to higher average returns than those indicated above?

THE SYSTEMATIC USE OF A SECOND CEREAL CROP.

The first and most obvious change that can be advocated with perfect safety in districts such as you represent is the more systematic use of a second cereal crop, generally barley or oats coming in succession to a crop of wheat or hay. We should then have one or the other of the following rotations:—

I.	•
First year	Bare fallow.
Second year	
Fourth year	
II.	
First year	Bare fallow.
Second year	Wheat or cereal hay.
Third year	Barley or oats.

Either of these rotations could be adopted without encroaching upon the area at present under wheat, and both would lead to greater gross returns from the land farmed in the four counties. If, for example, out of the 431,168 acres left out of cultivation 150,000 acres had been under barley yielding 18½ bush, to the acre, and 150,000 acres under oats yielding 14½ bush, to the acre, this, at the average prices obtaining between 1909 and 1913, would have represented an addition of close on £660,000 to the yearly gross revenue of the four counties. I am of course aware that land left out of cultivation is not necessarily non-revenue producing; that its grazing value is a useful asset to the farmer who carries livestock. These returns, however, even under the most favorable conditions, cannot equal those from an average second crop of barley or oats.

And here, speaking parenthetically, may I say that with the exceptional agricultural conditions of your four fine counties, average yields

of 18½ bush. for barley, and 14½ bush. for oats are—let us say—very disappointing. From the point of view of an ex-farmer it is surprising to me that these average yields are not twice as great in districts such as yours; and without question, if you wish to secure higher general gross returns, you will have to attend to other questions besides those we have at present under consideration.

I am of course aware of the usual objections to any further extension of the areas at present under barley or oats. They are said to be not locally saleable, and possibly the present chaotic state of the market will be adduced in support of this. Now, in the first place, under no consideration whatever can we draw up plans and considerations based on the present condition of things; we are at war, and everything is in consequence abnormal. Later on, when we are again at peace, we shall take up the threads where they were dropped, and in those times we shall find that both barley and oats are quite as much exportable commodities as wheat. All that is necessary is that a regular exportable surplus be available from year to year.

But, further, we are too apt to overlook the fact that the farmer's normal business is not confined to the growing of crops that are immediately saleable; that it includes, too, the art of converting crops into more valuable flesh and other animal products; and that as a rule this side of the farmer's business is frequently the more profitable of the two. Both-barley and oats can be fed with advantage to all forms of livestock; and when we are not satisfied with local prices offering we are very far from being compelled to accept them.

This, then, is my first point—the gross revenues from your four counties would be considerably increased if a more consistent use of a second cereal crop were made. I say advisedly "more consistent," because from the figures given it is evident that the practice is already in use, to a limited degree at all events. The average figures quoted above show 115,598 acres under cereals more than the average area under bare fallow, i.e., about one-fifth of these crops are probably sown as second crops. It is, therefore, merely a question of increasing the proportion.

THE GROWING OF FALLOW CROPS.

Close on one-third of the area farmed and one-half of the area tilled in your four counties is yearly treated as bare fallow. The benefits the South Australian farmer has derived from well-tilled bare fallow are incalculable, and I am not here to decry the practice. I wish, however, to point out that this excellent practice is very far from being a local invention, or even to any extent peculiarly Australian in its adaptation to local conditions. One hundred years ago or so to fallow land before wheat was the hall mark of advanced farming throughout

Western Europe; in North Africa, I was told by native farmers 25 years ago that it was a practice to which the farmers of less-favored districts were driven, because they could not grow wheat without it. Their inference was that no farmer would fallow his land if he could possibly avoid doing so. I do not wish to question the practice of bare fallowing to the extent that it applies to South Australian farming in general. I must, however, emphasize the fact that in many countries the practice of bare fallowing has proved no more than a single phase in the general progress of agricultural development; that in the course of time the march of events-chiefly increase in population—has rendered uneconomic the protracted loss of the use of the land which bare fallowing always implies, and has led to its supersession by other practices. Now, I know very well that you are all wedded to bare fallow—and, no doubt, rightly so in many cases-I am prepared even to admit that in so far as it is at present given us to foresee we shall not probably be able to do without it over the bulk of our agricultural areas; but I cannot admit that it is not worth considering whether, in many of the more favored spots of the four counties which you represent, we could not do without a little less bare fallow than is at present the case.

However much we may be alive to the advantages of bare fallow before wheat, we cannot avoid recognising that some disadvantages do attach to the practice, and the chief of these is the loss of the land for ten solid months. With us it is not seven or eight months that are required to raise a crop of wheat, but 17 or 18; and meanwhile rent, or interest on capital value, or on mortgage, never sleeps. Personally, I believe that for many generations to come we shall continue a wheat-exporting country; that wheat-growing will continue the sheet anchor of our farming: but if nowhere in this State wheat can be grown to any extent without bare fallow, then the chances of successful closer settlement over any extensive area are very remote indeed. Farms, to be worth holding, must continue within the neighborhood of four figures in area, and rural population thinly scattered and without cohesion, as is at present the I feel, however, that, apart from our extreme South-Eastern lands, if there are any districts in the State on which bare fallow before wheat can be-I won't say dispensed with-but adhered to less slavishly, they are to be found, in some portions at all events, of the counties which you represent.

Let us assume for the sake of an argument that you agree with me in this view. What is the next step in agricultural development which usually succeeds to the practice of bare fallow? It is as a rule the growing of what are known as fallow crops. These crops, as the name implies, besides being directly remunerative in themselves, are called upon to carry out some of the functions of ordinary bare fallow—that is to say, they are called upon to prepare the way for the wheat crop that follows; hence they must clean the land of weeds, and present it at wheat seed time in a suitable condition tilth. Now, this is not a little to ask of a crop, and not all are likely to pass muster for our purposes. Another winter cereal crop, such as oats or barley, is quite unsuited for the purpose; the same may be said of spring-sown mangolds, which are as a rule too late in the ground to render possible effective preparation of the soil for wheat. the crops that are actually available to us, we have the choice between those that are winter sown and those that are spring sown. From some points of view, theoretically at all events, the advantage would appear to lie with spring-sown fallow crops. advantage is that during the winter months we have ample time for preparation of the soil, which, be it noted, concerns not the fallow crop alone, but the wheat crop also that must follow. Unfortunately, however, in our drier districts at all events, these spring-sown and summer-growing fallow crops react as a rule more or less injuriously on the yield of the wheat crop of the succeeding Such, at any rate, was my experience at Roseworthy, where a sorghum crop made as a rule a difference of 3bush. to 4bush, an acre on the wheat crop that followed. relatively to the districts you represent, Roseworthy is very far from being a favored locality; and it may be that in this direction many of you are likely to be more successful than I.

In the matter of suitable spring-sown fallow crops, our choice is on the whole very limited. The well-known sorghums, millets, and even maize are typical crops of this kind. Where they can be grown successfully, and where the means of turning them to advantage exist, they can be strongly recommended. If you have farmyard manure available, you cannot put it to better use than ploughing it under whilst preparing the land for these crops; the greater the supply the more abundant the crop, given satisfactory rainfall conditions. Let it not be forgotten, too, that these crops cannot be left to themselves between seeding and final utilisation; in their own interests, and in the interests of the wheat crop that follows, they must be kept constantly tilled and clean throughout the growing season. Those who are not prepared to give them adequate attention in this direction had better not play with these crops when grown in rotation with wheat.

Nor, indeed, is our choice very large in the matter of winter sown fallow crops. As having some chance of success in many parts of

the four counties, I would instance—Field pease, field beans, white mustard, vetches, and rape if germinating sufficiently early for the purpose.

Pease, beans, and vetches present the advantage of being leguminous crops, and therefore nitrogen gatherers; this is always a useful characteristic in a country addicted to bare fallowing. Pease might almost be considered as spring-sown crops, and would probably be treated as such in the colder portions of your districts. If heavy grain crops are to be harvested, they must escape frosts when in bloom; hence early sowing results as a rule in luxuriant leaf and stem growth, but very scanty pods. Pease admit, however, of varied treatment; they may be grown for their grain, or they may be treated as forage or grazing crops. An inborn aversion to harvesting pease made me fall back upon them at Roseworthy for forage purposes; and I sowed them in consequence early and thick. luxuriance was usually great—one season I cut as much as 9 tons of green stuff to the acre—and the fact that this crop was invariably cut or grazed early, prevented weeds from going to seed and thus spoiling the land for wheat. I admit, however, that a full-podded crop, when obtainable, is a profitable investment indeed. that the average yield for the four counties is 164 bush, to the acre, with prices varying from 3s. 9d. to 4s. 3d. Perhaps, had my lot been cast in a moister, cooler, and less windy district than Roseworthy, I should have persevered with pease in spite of harvesting difficulties. I cannot help marvelling, however, that the ingenuity of our implement makers has not yet succeeded in producing a really efficient pea harvester. I note with pleasure that pease have already got a good hold of some of your districts, and any further extension that you can give to this crop will, in my opinion, be much to your advantage. Even when late sown the period of growth of pease is so short that there always is ample time for subsequent preparation of the land for wheat. True, they encourage weed growth, particularly if sown early; but weeds can be kept in check with the harrows in the early stages, and later on by conscientious horse hoeing; or else the crop can be cut or grazed before weeds have had time to run up to seed.

Field beans are a crop that are very rarely grown in South Australia; and yet in heavy land they replace pease, as a rotation crop, very advantageously. In the heavier agricultural lands of England it is a common practice to grow wheat and beans alternately in a two-course rotation. They are chiefly grown for their grain, which, when ground, forms excellent livestock food; but beans may also be

used as green forage or for ensilage purposes, particularly if grown in mixture with oats, rye, or barley.

I would like to recommend vetches as an alternative to either pease or beans; no more efficient nitrogen-collecting crop exists than vetches. Unfortunately, the local price of the seed is such as to render their practical utilisation altogether out of the question.

The great advantage attaching to white mustard is the rapidity of its growth in the cold months of the year. It may be sown on the fallows in midwinter, and be ready for grazing before other spring growth is at all abundant. If sown early, on the other hand, it will supply an abundance of winter feed. There is always ample time subsequently to cultivate and clean the fallows in anticipation of the coming wheat crop.

I referred to rape as a possible winter fallow crop only tentatively; everything in this connection depends on the character of the early autumn months. If the latter end of March and the whole of April are moist and moderately cool, rape will make a very successful winter fallow crop, which, after affording ample grazing, can be cultivated out of the ground in early October. If, however, rape germinates late, it makes exceedingly slow growth during the cold months, and does not really become available for grazing until early spring; hence if one is to reap any benefit from it as a grazing crop it must be kept on the land rather later than is advisable in those districts in which the influence of summer fallow crops is more or less detrimental to the subsequent growth of wheat.

FORAGE CROPS.

But, after all, the question of greater variety in our cropping is chiefly bound up in the advisability or otherwise of raising forage crops in general; and, unfortunately, the latter problem is involved in a maze of economic difficulties. We know how limited are the farm crops the produce of which is readily saleable in the natural state; they practically end with the cereals and the leguminous grain crops, all of which we already raise on our farms to a greater or less degree. True, there are also various industrial crops, such as flax, tobacco, cotton, colza, sugar beet, &c., some of which we could undoubtedly grow in suitable localities; for their success, however, they imply at the back of them an industrial organisation which we do not at present possess. Hence, for the time being, in our farming we are limited to the direct or indirect production of the immediate necessaries of life; and when we seek to grow anything beyond the readily saleable cereals we are inevitably thrown back upon those crops upon which livestock can be reared or fattened, i.e., forage crops. Many of the latter, it is true, can be grown as fallow crops, as we have already had occasion to see; many, however, must be handled on different lines if we are to take full advantage of them.

The importance of forage crops to a country able to take them up seriously may be gauged by a reference to some data, quoted by me last year at a Mount Gambier Conference, and bearing on the special position of England and Wales. In these countries the total area under cultivation was shown to be 11.058.233 acres in 1913. of this total 4,274,142 acres were occupied by true forage crops, i.e., between 38 and 39 per cent. of the total area tilled in a single year, er 3.865 acres in every 10.000 acres cultivated. These figures will serve to show how largely forage crops enter into the rotation of English farming. The question before us is not whether one-third of our cultivated area could be placed with advantage under forage crops, but whether, in the ordinary circumstances of farming, these crops can be raised by us at all profitably and to conspicuous advantage.

I shall endeavor to work out the solution to this question by a graphic illustration. Let us take the position of a man owning, in a good locality, a thousand-acre farm, on which 400 acres come yearly under cereals, 300 acres are treated as bare fallow, and the balance left out of cultivation for grazing purposes. Now, if in addition to his ordinary cropping our farmer were to raise 10 acres to 20 acres of forage crops, he could hardly be said to be more than playing with them; nor could these patches of crops have the slightest influence on the general rotation of his farm. And yet it is questionable whether, in existing circumstances, he could do much more.

The position may be illustrated in the following fashion:—We must assume that without encroaching on the area under cereals, the farmer endeavors to place one-quarter of the area under crop—by no means an excessive proportion—under forage crops. This would imply about 133 acres under forage crops, taken partly from the area under bare fallow and partly from the area left out of cultivation.

It is one of the consequences of our present agricultural conditions to think in vast areas; and to a man who can handle with ease 400 acres or 500 acres of wheat, it may appear no more difficult to grow 133 acres of forage crop than 10 acres or 20 acres. Such, however, is very far from being the case, as I shall now endeavor to show.

In the first place, so important a fraction of the farm cannot be placed under forage crops without materially affecting the general scheme of rotation. One of the chief consequences of this change

will be that the area under forage crops will have to be shifted every year from field to field. The immediate result of such a practice will be improvement in the general fertility of the land, much to the ultimate benefit of the cereal crops that follow; but if full value is to be had from the grazing capacity of the forage crops raised, it will also mean the subdivision of farm paddocks into relatively small units. Thus from the outset considerable outlay in new fences will be incurred, coupled with that involved in an adequate water supply to a large number of small fields.

Secondly, if it is comparatively easy to sow forage crops, it is quite another matter to get maximum or even paying results from Unlike wheat, they almost invariably call for a good deal of more or less costly after cultivation; and when the latter is neglected the crops are hardly worth raising, and the weed-infested land becomes unfit for later cereal crops. Hence, forage crops, if taken up at all seriously, carry with them as a rule a very appreciable increase in the labor bill. I am not bringing this forward as an objection to forage crops in general, but as a fact which cannot be overlooked, and which implies that land cannot be made to yield greater returns unless more money is put into it. In the circumstances, the net returns from forage crops will challenge comparison with those normally secured from the area left temporarily out of cultivation; and from personal experience I know that the latter is very far from being despisable. In fact, I am prepared to state that whilst the livestock-carrying capacity of a well-grown forage crop is perhaps infinitely superior to that of the spontaneous herbage of our stubbles, a neglected, poorly-grown forage crop will be both more costly and less productive than the latter in any good district.

Thirdly, if forage crops are to be grown at all extensively, and to be utilised on a large scale, the livestock of our farms will have to be increased manifold. From the point of view of the State's prosperity and future progress, this I have always viewed as a very desirable objective. From the point of view of the individual, however, it must be pointed out that important increases in livestock must mean correspondingly important increases in capital outlay.

And, lastly, the wheat farmer who turns his attention to forage crops and livestock, if he is to achieve success, must set about learning a new trade. And we all know how slow and painful a process this is, when every initial step taken is a step in the dark, and a plunge into financial ruin more easily taken than avoided.

My general conclusion, therefore, is that whilst a wide utilisation of forage crops would enable us to introduce with great advantage to the State greater variety into our farming, the step cannot be taken with safety without important additions to the working capital of the average farmer; hence we may infer that until we, as a State, are ripe for further steps in closer settlement, the regular introduction of forage crops into our farming rotations is bound to remain more or less impracticable.

CONCLUSION.

I am conscious of having touched upon a variety of subjects, and it is possible that I may be thought to have strayed somewhat from the subject matter of my address. I cannot, however, agree that such has been the case. In conclusion, let me say that I feel confident that many localities in the districts which you represent are capable of far more varied farming than is at present practised, and that they offer ample scope, therefore, for far more varied rotation. I believe firmly, however, that ultimate success in this direction is tied up with the possession of smaller individual areas; the putting into the land of more capital and labor; the employment on the farm of a larger number of regular permanent hands; the increase of our flocks and herds; the expansion of our dairy and pig industries: the fostering of our export trade and tottering industries by the State; the creation, perhaps, of village communities and the adoption of co-operative effort wherever practicable. seem a lot to claim for so simple a subject as the rotation of crops or more diversified farming. I stated at the outset that this subject, whilst academically simple, was nevertheless surrounded with practical difficulties. I now say that it is the foundation stone on which the future prosperity of your districts will be built. have succeeded in persuading you that such is indeed the case.

DISSOLVING BLUESTONE.

It is not absolutely necessary to use boiling water to dissolve the bluestone crystals in the making of the pickling solution, but it is certainly a great help. Hot water dissolves bluestone quickly, whereas cold water does it slowly, so that at any time there is a hurry for more solution use a small quantity boiling water in which to dissolve it, and add the solution to the vat of cold water. When dissolving bluestone in cold water it should always be put in a piece of hessian or bran bag and suspended in the solution, for it will take some days to dissolve if just thrown into the vat.—W. J. Spafford, Superintendent of Experiments.

ROSEWORTHY AGRICULTURAL COLLEGE.

HARVEST REPORT, 1915-16.

By W. J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S., Principal Roseworthy Agricultural College.

(Continued from page 800.)

BARLEY CROPS.

Our usual practice is to sow 100 to 200 acres of stubble land with varieties of barley (Hordeum Vulgare and hexastichum), and under ordinary circumstances this policy would have been adhered to. It happened, however, that many acres on which the 1914 crops had failed were admirably adapted for growing a crop of wheat, and consequently the barley area was reduced to approximately 30 acres.

In Daly's B. and C., a field of 100 acres, 20 different varieties were sown, the plots varying from small fractions of an acre up to 3.927 acres in extent; the total area under barley in this field being 24.234 acres. Particulars regarding the character and treatment of the soil in this block are given under "The Wheat Crops" section. The growth made was exceptionally heavy and led to lodging in the case of the earlier varieties. Unfortunately, the seed was sown unpickled, and two of the plots developed a number of smutty Seed at the rate of 50lbs. and 36/38 grade mineral superphosphate were sown per acre during the first week of May. Seventeen barleys imported from Tunis were tested, and the poorest of them yielded 37bush. 8lbs. per acre. As the areas concerned were very small in some cases, it would be misleading to quote the acreyields, but it may be pointed out that the early barleys returned on the average less grain than the slower-ripening ones. Excluding from consideration all areas under 1 acre, it will be found that the acreyield was 44bush. 24lbs. from an area of 18.52 acres.

The balance of the 1915 barley crop was grown on three plots in No. 4 Rotation Experiments. Shorthead Selection 8 was the variety used, and it yielded 33bush. 18lbs. per acre.

The general average over the total area of all plots comprising one acre or more—24.442 acres—works out at 41bush. 40lbs. per acre, and the effect of this on the mean yield is to raise it by almost a bushel per acre. I would draw special attention to the appended table, which shows that on stubble land we have grown an average

of nearly 31bush. of barley per acre for the 12 years ending 1915. In a season like 1916, when farmers will be called upon to seed large areas of autumn-ploughed land, it would be well to consider carefully the claims of barley as being a crop more likely than wheat to yield heavy and profitable returns from unfallowed fields. Barley seed is relatively low in price, the seeding required is not heavy, and the seed may be later sown than wheat, and hence more time is available for preparing and cleaning the seed-bed.

Table XII.—Showing General Average Barley Yields on the College Farm, 1904-1915.

	Ave	rage			
Season.	"Useful."	Total	\mathbf{A} rea.	Yield p	
	Inches.	Inches.	Acres.	Bush.	lbs.
1904	11.60	14.70	27.86	38	33
1905	14.23	16.71	65.73	25	4
1906	16.31	19.73	51.00	40	38
1907	13.96	15.13	79.30	31 .	21
1908	15.52	17.75	94.83	43	49
1909	21.15	24.05	75.27	35	0
1910	16.79	23.87	113.42	37	9
1911	9.45	13.68	76.09	39	31
1912	13.05	14.97	123.82	22	21
1913	10.82	15.66	91.09	12	19
1914	6.12	9.36	12.85	2	26
1915	18.33	19.76	24.44	41	40
Mean o	f 12 years			30	45

OAT CROPS.

Oats did not take a prominent place in the 1915 cropping scheme. Three varieties, namely, Scotch Grey, Sunrise, and Algerian Tartar, were grown in Daly's B. and C., but the whole area only amounted to 1.096 acres. Off this block 36bush. 3lbs. were harvested, so that the yield per acre comes to be 32bush. 32lbs.

Table XIII.—Showing Average Yields of Oats on the College Farm, 1905-1915.

						Rai	nfall.	Area			
Seaso	n.					"Useful"	Total	sown.	Yie	ld per	Bush.
						Inches.	Inches.	Acres.	Ε	Bush.	lbs.
1905						14.23	16.71	20.00		43	10
1906		٠.				16.31	19.73	33.50	*	41	18
1907	٠.	٠.				13.96	15.13	20.00	Comple	te fail	ure from
									feeding	off wi	th sheep.
1908						15.52	17.75	20.00		22	28
1909	٠.					21.15	24.05	23.52		43	19 -
1910						16.79	23.87	24.60		28	15
1911	٠.					9.45	13.68	22.82		22	8
1912	٠.	٠.				13.05	14.97	52.00		10	4
1913						10.82	15.66	3.33		11	36
1914	٠.	• •		٠,٠		6.12	9.36				
1915	٠.			٠.,		18.33	19.76	1.10		32	32
			A٦	era;	ge :	for 9 years	(omitting	1907 and	1914)	28	19

RYE CROPS.

Our rye crops in 1915 were sown in the north-eastern corner of Daly's B. and C. on a sand bank, which suited them admirably. Like the other cereals, they appreciated the weather, and they ultimately grew to over 6ft. in height. The same four varieties—March, Multicaule, Giant Winter, and Schlanstedt—were grown as formerly, but the yields were higher this season than ever before. They were sown at the rate of 60lbs per acre, together with 2cwts. of first-grade superphosphate. The returns are summarised below:—

Table XIV.—Showing details of Rye Crops.

Variety.	Area. Acres.	Yield per Bush.	
March	1.361	22	41
Multicaule	1.396	23	47
Schlanstedt	0.254	27	31
Giant Winter	0.404	23	24
Average yields of rye in 1915		23	35

Table XV.—Showing Yields per Acre of Rye on College Farm, 1909-1915.

Season.	March Rye. Bush. lbs.	Multicaule Rye. Bush. lbs.	Giant Winter Rye. Bush. lbs.	Schlanstedt Rye. Bush. Ibs.	Means. Bush. lbs.
1909	7 46	8 44	11 34	4 3	8 15
1910	16 4	12 40	12 36	15 14	14 9
1911	20 9	11 24	9 45	9 48	12 43
1912	15 6	11 22	11 4	10 13	12 0
1913	11 49	11 42	12 0	7 0	10 36
1914	3 20	3 11	0 47	0 51	2 0
1915	22 41	23 47	23 24	27 31	23 35
Means	13 49	11 49	11 35	10 39	11 50

THE WHEAT CROP.

The College wheatfields for last season contained relatively few varieties, although the area harvested amounted to 387.49 acres, the largest wheat area in the history of the farm. The reduction in the number of varieties was in a measure forced upon us by reason of the 1914 drought, which deprived us of good seed in respect of a number of promising wheats. Apart, however, from this misfortune, which might have been met by outside purchases to some extent, it was considered judicious to aim at the production of a surplus of pure clean seed gathered from a few reliable and ap-

The quality of the seed wheat which circumproved varieties. stances compelled many farmers to use last year was not generally considered to be good enough to warrant the grower in holding back a portion of his harvest for the 1916 seeding, and it was anticipated that a demand would arise for clean sound graded seed with which to re-stock the farms. We therefore, sought to meet this demand by restricting our attentions to the most consistent yielders amongst the wheats adapted to this district. Represented in the Farm crops were King's Red (100 acres), Gluyas (117 acres), King's White (18 acres), College Eclipse (32 acres), Late Gluyas (9 acres), Queen Fan (5 acres), Caliph (6 acres), and Basil (2 acres). whole of the area in the experimental fields, namely 78.063 acres, was occupied by King's White, so that the total area under this variety was approximately 96 acres. The wheat crops for 1915 were located in Islands A and B., Ebsary's B., Grainger's C., No. 16, Nottle's A., No. 4, Grainger's B., and Daly's B. and C. Except where otherwise stated, it may be understood that the wheat was sown at the rate of 90lbs, per acre in conjunction with 2cwts. per acre of 36/38 grade mineral superphosphate.

Table XVI.--Summary of Wheat Returns, 1915.

Experimental crops (1 acre and over) Farm crops	Area. Acres. 78.063 289.208	Bush. 1664		Yield per Bush. 21 21		
Totals		7790 206	6 4	21 10	13 11	
Grand total	387.492	7996	10	20	38	

ISLANDS A. AND B.

In the remarks on the hay crops, the treatment accorded these fields has already been outlined. It so happened that the highest selection of King's Red, namely, Selection 8, was sown in Island A., and as we desired to save a little seed for next year, a small plot measuring 0.709 acres was reserved for grain. Being badly laid by rough weather, this had to be harvested with the reaper-thresher, but even so the straw was so tangled that considerable loss occurred, and consequently the yield (11bush. 35lbs.) is much below that of the same variety in Island B. In the last mentioned field, a block of 100 acres was allowed to stand for grain. The crop, which consisted of King's Red, Selections 6 and 7, went over in patches, particularly on the Selection 7 plot, and the yield was materially affected through losses in harvesting occasioned thereby. We used a reaper-thresher with the "East" false comb attached, and were

thus enabled to secure all that could be taken off without binding and threshing. Nevertheless, the yield over the 100 acres was at least 3bush. or 4bush. below our expectations.

Table XVII.—Showing Wheat Yields Obtained in Islands A. and B., 1915.

						Total y	rield.	Acre	yield.
Field.	Variety.		Sele	ection.	Average.	Bush.	lbs.	Bush.	lbs.
Island A	King's Red			8	0.709	8	13	11	35
	King's Red				40.486	637	54	15	45
Island B	King's Red			6	59.406	1204	28	20	16
	Ü	_	Aver	age				18	24

EBSARY'S B.

The soil in this field is very variable in character, ranging from black swamp land to sandy loam. The field comprises 74 acres, but after deducting hay headlands and areas rendered uncroppable by reason of winter inundations, the actual area available at harvest was found to be 59.925 acres. The earlier history of the field may be summarised as follows:—1899, fallow; 1900, wheat; 1901, fallow; 1902, wheat; 1903, fallow; 1904, oats; 1905, pasture; 1906, fallow; 1907, oats; 1908, pasture; 1909, pasture; 1910, fallow; 1911, wheat and barley; 1912, fallow; 1913, wheat; and 1914, fallow.

It was not intended at first to fallow this field in 1914, but the dry season made it impossible to pick and choose, and we had to put the ploughs where they could do the best work. Being of a crumbly nature when dry, this field may be worked fairly late, and provided the heavy roller be freely used to ensure consolidation, a good seedbed can be prepared from late ploughing. It is not to be understood that this practice is advocated except when circumstances beyond control force us to augment the area of fallow by resort to late ploughing. In 1914 the fallow ploughing in this field was not finished till October 9th. After a good disc ploughing, the soil was immediately compacted with iron rollers and surface cultivated, and it was again rolled and cultivated early in the new year. Knowing the character of the land and the danger of delaying seeding too late, I decided to get it drilled as soon as the risk of "malting" appeared to be negligible. The land was cultivated once more before sowing, and the soil was in good seeding condition when the drills were set going on April 20th. The dry spell that ensued caused some of the grain to remain inactive, and fears were entertained that the patchy germination was due to "malting." However, the May showers soon showed that no damage had resulted, and the crop rapidly improved, although the two germinations were discernible right through the growing period. Selec-

100 m

tions 7 and 8 of Gluyas were sown at the rate of 106lbs, per acre. Like the King's Red in the "Island," this field of Gluyas required a harvesting machine that would elevate it to the comb, and hence it had to stand till the reaper-thresher was available. This left the crop open to depredation by birds, and along the road-side they certainly caused considerable loss. The low yield from Selection 8, however, was due to flood waters, which completely drowned out an area of about 10 acres and gave a serious check to a very much larger area. Portions of this block that were unaffected by surplus water yielded quite as well as the Selection 7, and it is unfortunate that an accidental factor of this character should have caused such a wide discrepancy in the returns. The results obtained were as follows:—

Table XVIII.—Summary of Wheat Yields in Ebsary's B., 1915.

		Total yield.	·Acre yi	eld.
Selection.	Acres.	Bush. lbs.	Bush.	lbs.
Gluyas 7	19.884	431 13	21	41
Gluyas 8	40.041	496 58	12	25
Average			. 15	29

GRAINGER'S C.

In this field of 53.142 acres there were five different varieties of wheat, viz., Basil, Queen Fan, Late Gluyas, Caliph, and College Eclipse. The land is a good red loam with a number of claypans scattered through it. It was purchased and fallowed in 1909, and the subsequent treatment was as follows:—1910, wheat; 1911, fallow; 1912, wheat; 1913, pasture; and 1914, fallow.

The 1914 fallow was well worked, and the crops, which were sown in the first week of June, made the most satisfactory development of all the fields under wheat. One small patch of "take-all" was observed in the Queen Fan Plot, and portions of the College Eclipse were drowned out in the claypans. Otherwise, the crops were clean and healthy, being very little affected by rust. The yield table is appended:—

Table XIX.—Summary of Wheat Returns in Grainger's C., 1915.

Variety.	Selection. Acreage.	Total yield. Bush. Ibs.	Acre yiel Bush, Il	ld. bs.
Basil	1 1.961	55 53	28 :	30
Caliph	1 5.540	134 42		19
Late Gluyas	6 8.873	211 40	23	51
Queen Fan	. 4 5.084	117 48	23	10
College Eclipse	5 9.736	207 4	21	16
College Eclipse	6 21.948	432 10	19 4	41
Average			21 4	19

FIELD No. 16.

There are 63 acres of cropping land in this field. The soil ranges from pine sand to crabhole clay, but the bulk of it consists of light brashy limestone.

Past History.—1899, fallow; 1900, wheat and oats; 1901, fallow; 1902, wheat; 1903, pasture; 1904, melons and pumpkins; 1905, barley and rye; 1906, pasture; 1907, pasture; 1908 fallow (partly), white mustard (partly); 1909, wheat; 1910, barley; 1911, pasture; 1912, pasture; 1913, sorghum; 1914, barley and wheat (fed off).

The 1914 crop of barley and wheat was grazed down in August of that year, and the field was not touched again till seeding. In May it was scarified up, and during the first fortnight in June Gluyas (Selections 7 and 6) and King's White (Selection 6) were drilled in, together with 1cwt. of manure per acre. Rust made more headway in this field than in any other, and affected the grain, especially the King's White, which occupied the heavier land. The yields, however, were highly satisfactory, particularly that of Gluyas, Selection 7, which returned over 11 bags per acre. Details of the harvest are here given:—

Table XX.—Summary of Wheat Returns in No. 16, 1915.

Variety.	Selection.	Acreage.	Total ;		Acre yi	ield. lbs.
•		O				
Gluyas	7	22.477	747	52	33	16
Gluyas		14.010	389	47	27	49
King's White	6	17.955	391	45	21	49
Average					28	6

NOTTLE'S A.

Early in the year it was decided to subdivide Nottle's A. into two fields, to be known as Nottle's A. and Nottle's C. The subdivision here referred to as Nottle's A. contains 27 acres, but only 21.098 acres were harvested for grain.

Prior History.—1897, fallow; 1898, wheat; 1899, wheat; 1900, fallow; 1901, wheat; 1902, pasture; 1903, fallow; 1904, wheat; 1905, fallow; 1906, wheat and barley; 1907, pasture; 1908, fallow; 1909, wheat and oats; 1910, pasture; 1911, pasture; 1912, pasture; 1913, fallow; 1914, wheat and oats.

The crop of Gluyas, Selection 7, stood up well right to the last, and it appeared probable that it would give the record yield for the year. It very nearly succeeded in doing so, but, as reference to Table XX. will show, its yield of 31bush. 12lbs. per acre was beaten by a block of the same variety in No. 16, which returned 33bush. 16lbs. per acre.

PERMANENT EXPERIMENTAL FIELD No. 4.

In this field 57.835 acres were sown with King's White, Selection 6, at the rate of 90lbs, of seed per acre. The field consists of 71 plots, nearly half of which were under wheat this season. The plots receive different manurial dressings, and some are grouped to form rotations. Full details of the results will be published later in the year in a special report. The average yield for 1915 was 23bush, 56lbs, of grain and 2 tons 7cwts, 7lbs, of total produce per acre.

PLOUGHING DEPTH PLOTS.

Grainger's B.—The Depth of Ploughing Plots were continued last year on the bare fallow-wheat system, the crops being harvested for grain as usual. The plots are 1 acre in area, and consist of medium clay loams, typical of the best wheat-growing land in the district. The ploughing is 2in. deep on the first plot and the depth increases by 2in. gradations to 12in. on the last plot. The stubbles were all lifted in July, cultivated in September, December, and April, rolled with smooth roller in October, and harrowed in November and again before and after seeding. Seed (King's White, Selection 6) was sown at the rate of 90lbs. per acre on April 26th, and a dressing of 2cwts. mineral superphosphate was applied at the same time. They all germinated, flowered, and ripened together, and were cut down on November 12th and 13th. Threshing took place between Christmas and New Year, and the yields obtained, as well as the mean returns for the past five seasons, are shown below:-

Table XXI.—Showing Yields from Depth of Ploughing Plots, 1911-1915.

Dep	oth.	Total Produce per Acre.										Mean.					
	4	1911.		1.	. 1912.		19	1913.		914.		1915.		ີ 191	011/1915.		
		T.	C.	L.	T.	C.	L.	C.	L.	c.	£.	T.	c.	L.	т.	C.	I
		1	18	94	1	13	64	19	32	12	106	1	16	98	1	8	34
4in.		2	3	84	1	16	58	13	94	15	30	1	9	82	1	7	92
6in.		2	3	109	1	13	109	14	23	12	6	1	15	5	1	7	95
8in		2	6	78	1	12	56	15	20	13	109	1	17	41	1	9	16
10in.		2	4	72	1	14	37	16	43	10	60	1	18	74	1	8	102
12in.		2	6	58	1	13	79	12	86	9	42	1	19	37	1	8	38
Depth.				Grain per Acre.						Means.							
				,	1911.		19	12.	19	13.	19	14.		1915.		1911	/1915.
	Bush. lbs. Bush. lbs. Bush. lbs. Bush. lbs. Bush. lbs.							bs.	Busl	h. lbs.							
2in.				I	9 3	4	19	11	11	55	8	28	1	8 5	3	15	36
4in.				. 2	7 1	0 -	21	27	7	31	10	47	1	4	7	16	12
6in.				. 2	5 2	9	21	39	7	48	10	19	1	6 3	7	16	22
8in.				. 2	8 2	3	21	21	8	34	10	21	1	7 5	3	17	18
10in.				. 2	7 2	3	21	.41	9	11	9	42	1	8	5	17	12
12in.				. 2	6 3	2	22	55	8	32	9	6	2		4	17	28

When studying these figures the rainfall table given in connection with the Cultivation Plots in Grainger's A. must be consulted. The most remarkable features of the 1915 harvest are the extraordinary high yield from the 2in. ploughing and the disparity between this and the return from the 4in. plot. If we disregard the 2in, plot we find that the other five yielded a gradually increasing amount of both grain and total produce as the depth of ploughing increases. Yet from the 2in, plot the yield is seen to be 48lbs, per acre in excess of that from the 10in. ploughing. There does not appear to be any adequate explanation for this irregularity, and we know of no special circumstances that might account for it even in a partial degree. Once before (1913) this shallow ploughing yielded 3 or 4 bushels more than the other plots, and it was thought that this was probably due to a better germination, but our observations this year did not lead us to think, at any stage in the development of the crop, that the deeper ploughings would return less than the 2in. plot. Passing from the 1915 yields to the mean figures for the five years 1911-1915, we notice that the plots are gradually assuming the positions in relation to one another that one would, on general grounds, have expected them to occupy. Thus, in the grain yield it will be seen that there is a steady increase as we pass from the shallow to the deeper ploughings. The difference between contiguous plots does not amount to a bushel in any one instance, but between the two extreme depths there is a discrepancy of 1bush. 52lbs. in favor of the deeper furrows, and this, at 3s. 6d. per bushel, would be worth approximately 6s. 6d. per acre. more importance from the practical standpoint to contrast the returns from the 4in, and 6in, plots. Here we find a margin of only 10lbs. in favor of the deeper ploughing, and adopting the same value as before, this works out exactly at 7d. per acre. figures do not afford a very strong argument in favor of deep ploughing, but we have to take into consideration the fact that the experiments have only recently been inaugurated, and consequently the cumulative effects of shallow ploughing on the one hand which are held to be detrimental, and of deep ploughing on the other hand which are believed to be beneficial, have not yet had time to reveal themselves. The average return over the 6 acres in this test was 17bush. 38lbs. of grain and 1 ton 16cwts. 19lbs. of total produce per acre.

DALY'S B. AND C.

The hand plots and seed plots for 1915 were located in Daly's B. and C., which together comprised approximately 100 acres. Of

this area 24.234 acres were sown to barley, 1.096 acres carried oats, and 3.415 acres were under rye crops. The balance of the field, after allowing for roadways, divisions, and hand plots, was occupied with small seed plots for a number of different wheats undergoing field tests. These all received the usual dressing of 2cwts. of 36/38 mineral superphosphate per acre, and a good germination resulted. The continuous wet weather, however, checked the early growth, and the weeds gained such a start that the whole block had to be hand-hoed in the spring. The crops never recovered properly from this setback, and consequently the yields are in most instances below the general farm average. Following the usual practice, all plots under 1 acre in extent have been disregarded in computing the general average yield for the year.

Table XXII.—Showing Detail of Seeding and Yields from Plots of 1 Acre and Over Grown in Daly's B. and C., 1915.

Variety.	Selection.	Area. Acres.	Date sown.	Seed per acre. lbs.	Yiel per a Bush	cre.
King's White	9	1.237	June 15	90	21	37
Fan	5	4.203	June 14	90	16	17
Gluyas	9	2.159	June 14	90	10	49
King's Red	9	2.125	June 14	90	10	40
College Comeback	6	2.898	June 15	90	8	35
College Eclipse	7	1.611	June 15	90	5	43
Average					12	16

THE YIELDS OF DIFFERENT VARIETIES OF WHEATS GROWN IN 1915.

Table XXIII.—Showing Yields of Varieties of Wheats Grown as Farm Crops in 1915.

Variety.	Area.	Acre Highest		Acre. Lowest y	rield.	Average ac	ere yield.
	Acres.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
Gluyas	117.510	33	16	12	25	33	. 11
King's White	17.955	21	49	21	49	21	49
King's Red	100.601	20	17	. 11	35	18	24
Basil	1.961	28	30	28 .	30	28	30
Caliph	5.540	24	19	24	19	24 ·	19
Late Gluyas	8.873	23	51	23	51	23	51
Queen Fan	5.084	23	10	23	10	23	10
College Eclipse .	31.684	21	16	19	41	20	11

Table XXIV.—Showing Yields of some new College Crossbred Wheats (1907 to 1910 Crosses).

									(1)	90) 1	911	UC	TO	556	8).	•							
Means.	_:		15 23	14 56	13 24	12 23	12 10	11 50	9 47		8 34	6 28	1	[l			!	1	1			1	1	1
1915.	_:		18 36	11 5	8 35	11 2	17 - 38	9 20	.12 25		2 13	5 50	12 - 20	87 9	2 34	6 1	3 49	3 49	6 32	8 28	3 17	2 41	3 17	23 5	5 11
1914.	Busn, 10s.	10 12	1	**************************************	1	5 9	-	l	11 49		18 56	8 20	1	l	5 47	5 52	1	5 19	1		4 23	35 36	10 46	l	١.
1913.	4	6 53	7 19	10 - 23	5 5 5 5 6 7	10 19	8 8	12 31	5 7		4 34	5 13	14 40	1	1].		l	l	1	1	-	I		l
1912.	7	28 20	20 14	23 20	56 16	93 0	10 43	13 4			l	l	ı	Ì	1	1	ì	1	-		1		1		l
	Selection. Pedigree.	Marshall's No. 3 x King's White (1908)	Late Gluyas x Fan (1908)	Jonathan x Fan (1908)	King's White x Jonathan (1907)	Fan x Red Fife (1907)	Fan x Comeback (1908)	Carmichael's Eclipse x Red Fife (1907)	Late Gluyas x Petatz Surprise (1909)	Marshall's No. 3 x Indian Runner x Marshall's No. 3	$(1909) \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots$	Marshall's No. 3 x Petatz Surprise (1909)	Bearded Rieti x Fan x Petatz Surprise (1909)	Jonathan x Farrer's 52F2 (1908)		(1908)			Marshall's No. 3 x Indiau Runner x Marshall's No. 3 (1909)	Fan x Bed Fife x Jona (1910)	(1910)	Gluyas x Indian Runner x Gluyas (1910)	Carmichael's Eclipse x Indian Runner x Carmichael's Eclipse (1910)	Gluyas x Indian Bunner x Jona (1910)	Bearded Rieti x Gluyas x Jonathan (1910)
	Select		က	က	က	01	က	က	Н	¢3			c 2	4	co	က	4	က	က	¢3	Н	Н	Н	.ca	c 3
	Varieties.	Caliph	Daphne	Canaan	Anvil	Basil	Fancy	Brindle	Elite	Early	,	Ensign	Editor	Cad	Cad	Cad A	Cadet	Cadet	Earl	Eureka	Eureka	Exquisite	Ewer	Evening .	Echo

Table XXV.—Showing 1915 Fields of Latest Strains of College Hand-Scleeted Pedigree Wheats, Comparatively with the Yields of Earlier Strains in Previous Seasons.

					YIE	Γ DS	YIELDS PER	ACRE.	E.								
Varieties. 8	Selection.	19	1915	1914.	4.	1913.	69	1912.		1911	-	19	1910.	19	1909.	Means.	ms.
, .		Bush. Ibs.	. Ibs.	Busl	Bush. Ibs.	Bush, lbs.	.lbs.	Bush Ibs.	lbs.	Bush. Ibs.	lbs.	Bush, Ibs.	lbs.	Bush, Ibs.	lbs.	Bush, lbs.	lbs.
King's White	.10	16	43	15	46	00	30	56	53	17	0	ej Ej	72	<u>6</u>	10	19	90 90
King's Red	10	10	54	10	21	×	39	27	34	12	37	31 31	43	::3	41	18	51
Federation	2	∞	13		1	9	\$1 \$1	61	13	П	55	55	48	30 30	070	17	58
Bearded Gluyas	10	10	28	11	15	တ	31	82	9	14	38	91	51	30	35	17	2 4
Gluyas	10	18	59	2	10	10	56	21	35	∞	3 .	21	65	82	33	17	30
Late Gluyas	10	13	36	1-	21	2	16	23	44	14	-11	120	50	::	œ	17	97
Marshall's No. 3B	∞	6	9+	1	1	6	39	21	36	1.	50	97	38	71	61 61	17	င
Queen Fan	9	11	40	ı	1	6	55	23	9	61 61	25	1	ı			16	42
Jonathan	2	9	21	1	1	9	16	57 1 7	55	10	56	4.	-	27	45	16	45
Carmichael's Eclipse .	∞	7	48	1-	F.	2	55	67	53	16	53	82	21	61	20	16	16
College Eclipse	∞	2	67	œ	0	10	33	21	54	12	22	25	oo	61 T	47	15	45
Lamda	10	28	97	6	55	ιo	13	28	39	1		13	9	ಸರ	57	15	14
College Comeback	œ	œ	26	36	15	L~	19	17	27	∞	4	53	15	10	16	13	38
Le Huguenot	29	69	37		1	9	21	10	38			l	1	ļ		13	35
Beardless Odessa	ũ	19	55	©1	47	ତୀ	17	50	22	-		ı	ı			11	50
Beardless King	9	14	55	-	1	9	14	6	35				1			10	14
Yandilla King	4	9	21	,	1	9	4	17	27	1		1	1	l		6	57

Table XXVI.—Showing Yields of Miscellaneous Wheats Grown in Daly's B. and C., 1915.

Variety.	Selection.	Area.	Yield pe Bush.	r Acre. lbs.
King Fan	6	.025	3.4	40
Mahmoudi	—	.052	69	5
King's White	9	1.237	$\frac{20}{21}$	37
Crossbred 53		.564	20	30
Tunis		.437	20	6
Beardless Odessa	4	.123	18	ĭ
Petatz Surprise	4	.185	16	35
Fan	5	4.203	16	7
Algiers	—	.180	16	1
Wilmington	3	.055	14	51
Sevens		.591	12	45
Lamda	9	.171	12	5
American No. 8	· · · —	.285	11	3
Gluyas	9	2.159	10	49
King's Red	9	2.125	10	40
Late Gluyas	9	.519	9	57
Dymenos	—	.104	8	58
College Comeback	6	2.893	8	35
Bearded Gluyas	9	.617	8	0
German Wonder	1	.026	7	42
Carmichael's Eclipse	7	.925	6 1	23
Correll's No. 7	—	.181	5	54
Federation	3	.384	5	52
College Eclipse	7	1.611	5	43
College Comeback	7	.206	5	20
Dreadnought		.179	. 4	50
Cape	5	.154	3 .	28
Little Joss		.026	1	55

THE GENERAL WHEAT AVERAGE.

An all-round average of 21bush, 13lbs, from 367.271 acres is eminently satisfactory for this district. On three previous occasions since the records have been kept has the wheat been over 20 bush. per acre. In 1909 the figures were 25bush. 5lbs.; in 1905, 24bush. 11lbs.; and in 1908, 22bush. 14lbs. The highest yields in 1915 were obtained from two fields in which the cereal crop of 1914 failed and was grazed off, and the larger of the two received only half the usual dressing of 2cwts. of manure per acre. The grain from the fallowed fields, however, was of better quality and contained less King's White grown on fallow averaged 61.33lbs. per tailings. bushel, whilst that on last season's stubble went 58lbs. Similarly, there was a difference of one-third of a pound per bushel in the case On the whole, the 1915 wheat sample was below our usual standard, and the losses on grading will be relatively high. This was to be expected in a season marked by heavy winter rains and a dry spring, and in this respect I think the Roseworthy district was less favorably circumstanced than almost any other district in the State. A heavy yield of tailings, however, is by no means an unmitigated evil at a time when high prices are ruling in the pig trade.

The effect of the 1915 yield on the mean yield is to raise it by 32lbs. per acre, which brings it up to 17bush. 26lbs. Considered in relation to the rainfall, it will be noted that the mean yield of wheat for the period 1904-1915 is 17.43bush., and the mean rainfall 17.41in.

Table XXVII.—Showing the Average Yields of Wheat on the College Farm, 1904 to 1915.

Season.	Rainfall. 'Useful.'' Total. Inches. Inches.	Area under Wheat.	Average per ac	
		Acres.	Bush.	lbs.
1904	11.60 14.70	330.00	18	$3 \cdot$
1905	14.23 16.71	212.00	24	11
1906	16.31 19.73	318.00	14	30
1907	13.96 15.13	178.00	13	20
1908	15.52 17.75	258.52	22	14
1909	21.15 24.05	328.47	25	5
1910	16.79 23.87	267.35	16	38
1911	9.45 13.68	234.98	14	17
1912	13.05 14.97	232.89	19	36
1913	10.82 15.66	333.07	6	32
1914	6.12 9.36	148.69	11	28
1915	18.33 19.76	367.271	21	13
Average yield	of 12 years		17	-26

I wish to add, in conclusion, a word of appreciation to Mr. R. C. Scott, Assistant Experimentalist, and Mr. E. L. Orchard, Farm Superintendent, who have been associated with me in the preparation of this report.

EXPERIMENTAL FARM HARVEST REPORTS.

By W. J. Spafford, Superintendent Experimental Work.

2.—BOOBOROWIE EXPERIMENTAL FARM.

Manager: Mr. F. E. Waddy.

This farm is situated 120 miles north of Adelaide, and contains 1,344 acres and has an altitude of 1,200ft. to 2,000ft. It consists of two blocks, one, the old North Booborowie homestead, is "high" land running to the highest point in Brown's Hill Range, and contains 1,046 acres; the other block (No. 478) contains 298 acres of comparatively level land, which, in times of heavy rains, is flooded by the Tumela Creek, and is two miles from the homestead. This farm is situated in the centre of a very good district which contains land suitable for cereal-growing, lucerne-growing without artificial irrigation, and really good grazing land not arable. Unfortunately this farm

does not include any of the first-class lucerne-growing land of which many thousands of acres are to be found in the district, and as the raising of lucerne under these conditions is as yet in its infancy, possibly useful experiments in this particular line are impossible to us for the want of some of this land.

THE SEASON 1915.

The year opened at this farm with very little rain; 49 points fell in January. and nothing during both February and March. The average fall for these three months is 1.76in., but these rains are not of much use for the growth of wheat, other than in the cleaning of the land that is to be cropped. The deficiency of the first three months was made good by the April-May (seeding) rains, which totalled 3.96in. as against the average of 2.49in., and the winter rains (June-July) which registered practically 5in., when the average for this period is a little over 4in. The spring rains (August-October), with a total of 63in., were about 14in. better than the average for these three months. There was practically no early summer rain (November) this year, only a quarter of an inch fell, compared to over an inch for the last 16 years on the average; but this did not make very much difference to the crops. The total fall of 17.14in. was about 1in. above the average for the farm, which is 16.05in.; but what is more important is that the total "useful" rain was 15.95in. The table following sets out the details of the rainfall at this farm since 1910 with the means for the previous 10 years and the means for the whole period since 1900:--

Rainfall Distribution at Booborowie, 1900-1915	Rainfall	Distribution	at Booborowie.	1900-1915.
--	----------	--------------	----------------	------------

	Means, 1900-1909.	1910.	1911.	1912.	1913.	1914.	1915.	Means, 1900-1915.
	In.	In.	In.	In.	In.	In.	In.	In.
January	0.55	0.33	0.38	0.19	0.06	0.21	0.49	0.45
February	0.48	. 0.03	1.26	0.81	0.35	0.07		0.46
March	0.52	4.00	0.73	0.67	2.96	0.11		0.85
April	1.42		0.15	0.07	0.07	0.67	1.59	1.05
May	1.49	1.84	2.20	0.21	0.27	1.34	2.37	1.44
June	2.64	1.89	2.92	3.42	0.73	0.51	3.40	$2 \cdot 45$
July	1.92	3.13	2.10	2.11	0.83	1.13	1.56	1.88
August	1.92	1.25	0.73	2.22	2.99	0.10	2.22	1.80
September	2.06	4.37	1.59	1.89	3.32	0.45	3.34	2.21
October	1.74	1.72	0.81	1.11	1.66	0.45	1.22	1.53
November	0.95	1.08	0.24	2.17	0.99	3.14	0.25	1.08
December	0.69	0.61	2.30	0.63	0.84	1.58	0.70	0.85
Total Total "Useful" rain	16.37	20.25	15.41	15.50	15.07	9.76	17-14	16.05
(April to November)	14-14	15.28	10.74	13.20	10.86	7-79	15.95	13.44

DISTRIBUTION OF "USEFUL" RAINFALL.

As was pointed out in the report of Veitch's Well Experimental Farm, for cereal-growing part only of the total rainfall need be considered as "useful" rain, and all that falls between April 1st and November 30th can be considered as such. It is not only the total "useful" rain that controls what cereal crops shall be, but rather the distribution of these rains. In this connection the total "useful" rain amounted to 15.95in., and is $2\frac{1}{2}$ in. above the average total "useful" rain, which is 13.44in. But it was not only the large amount of "useful" rain, but its almost ideal distribution

that led to the record crop harvested at this farm. Good seeding rains (3.96in.), good winter rains (4.96in.), and exceptionally good spring rains (6.78in.) could hardly result in anything but good cereal crops when sown at the right time. The early summer rains (0.25in.) were very poor, but after such bountiful spring rains they were not necessary. The following table shows how these "useful" rains were distributed, and also the averages for 16 years:—

Distribution of "Useful" Rain in 1915, comparatively with the Means from 1900 to 1915.

	1915.	Means,
		1900-1915.
	In.	In.
Seeding rains (April-May)	3.96	2.49
Winter rains (June-July)		4.33
Spring rains (August-October)	6.78	5.54
Early summer rains (November)		1.08
Total " Useful " rain	15.95	13.44

CROPS.

Other than in experimental plots the only crops grown here this year were the various cereals; of these the wheats were all sown on well-fallowed land, and oats for grain and hav on cultivated stubbles.

Green Forage Crops.—From April 6th to 11th a total of 155 points of rain fell, which was sufficient to allow of the stubble lands being broken up. Field No. 5 was worked up, and on April 24th and 25th was sown with barley and oats for green feed. About six acres of this field, which is 16 acres in extent, where it becomes flooded by the main creek of the farm had 6lbs. of lucerne broadcasted to the acre and harrowed in. Both the barley and the oats grew really well, and the field produced much more than the horses and cows of the farm could consume without being on it all the time.

Hay Crops.—Field No. 8, comprising 45 acres, and which carried a crop of wheat in 1914-1915, was cultivated soon after the rain in the early part of April. Commencing on April 29th this field was sown to Calcutta oats for hay, using 82lbs, seed and 1cwt, superphosphate to the acre; but as the headlands produced such a large quantity of hay it was only necessary to cut about half of this field, the remainder being harvested for grain. On May 21st seven and three-quarter acres of fallow land in field No. 1 were drilled in with 100lbs. Le Huguenot wheat and 205lbs, superphosphate to the acre for hay. This field (No. 1) was rather on the wet side at seeding, but was in good condition otherwise, having received three cultivations after harvest—one in early April, another just before the rain, and a third soon after the rain and right in front of the drill—rendered necessary by the land caking after the heavy rains. The yield of these hay crops and those of the wheat and oat headlands are shown, together with the average yield for the year in the following table:—

Yields of Hay-Booborowie, 1915. Area. Total Yield. Yield per Acre. Acres. L. T. C. Le Huguenot wheat..... 25 0 0 3 4 Wheat headlands 2 21.87 60 5 0 15 11 Calcutta oats 2 45 0 0 11 98 2 Algerian oats 10 0 15 38 15 15 43 This average yield of 2 to s 15cwts. 43lbs, per acre is the record hay yield since this farm was started, and with the grain yields shown later, illustrates how very suitable this season was for both grain and growth in this particular district. The following table sets out the yields of hay for the farm, together with the average for 1912-1915; in it 1914 is shown as a total failure, which is not absolutely correct because there was a little growth, but which under the circumstances was not worth cutting.

Hay R	eturns—H	300borowie	, 1912-	1915.					
Year.	Total Rainfall.	" Useful " Rainfall.	Area.	Tota	l Yie	eld.	р	Yiel er Ac	
	In.	In.	Acres.	T.	c.	L.	т.	· C.	1.
1912	15.50	13.20	70.00	132	5	0	1	18	88
1913	15.07	10.86	76-00	109	14	()	1	8	97
1914	9.76	7.79		Fai	lure				
1915	17-14	15.95	$52 \cdot 27$	144	15	0	2	15	43
Means	14.37	11.95					1	10	85

Out Crops.—In field No. 8 45 acres of Calcutta oats were sown on cultivated stubble land at the rate of 82lbs, seed and lowt, superphosphate to the acre on April 29th. Part of this was cut for hay, and the remainder, consisting of 19.93 acres, was harvested and resulted in a yield of 26bush. 3lbs, to the acre. Part of field No. 14 was seeded soon after No. 8 with Algerian oats, and was finished on May 10th. These oats were drilled in at the rate of 78lbs, seed with lowt, superphosphate to the acre, and the 52·12 acres harvested yielded at the rate of 33bush. 37lbs, to the acre. These two blocks of oats, together with two rotation plots, amounted to a total area of 75·47acres, and produced 2,410bush. 20lbs., or an average yield per acre of 31bush. 38lbs. The year 1913 was the first one in which oats were harvested for grain, and the following table sets out the average yields since then with the means for the period:—

	Total	" Useful "		Total	Yield
Year.	Rainfall.	Rainfall.	Area.	Yield.	per Acre.
	In.	In.	Acres.	Bush. 1bs.	Bush, 1bs.
	15.07	10.86	54.00	1,394 13	32 11
	9.76	7.79		-	
	17.14	15-95	75-47	2,410 20	31 38

Oat Returns—Booborowie, 1913-1915.

1913 1914 1915

Barley Crops. Practically no barley of any kind has been grown on this farm in the past, and this season, other than that already mentioned as having been grown for green feed, the only barley grown was in two plots of the Rotation series.

One of these plots (No. 36) was dressed with 2cwts. superphosphate to the acre, and the other (No. 22) only received 1cwt. superphosphate to the acre. Both plots were sown at the rate of 50lbs. seed per acre. Plot 36 yielded 41bush. 7lbs. per acre, and plot 22 produced 27bush. 48lbs., and from an area of 3.09 acres the barley averaged 35bush. 6lbs. per acre.

Wheat Crops.—All varieties of wheat tried this season were sown on fallowed land that had been well worked throughout the year. Field No. 1 was cultivated in April and a start with drilling in wheat was made in this field on May 11th; 10½ acres of American No. 8 were sown at the rate of 80lbs. with 209lbs. of superphosphate to the acre. Rain fell as soon as this was completed and continued for 12 days for a total fall of 237 points. This rain

delayed seeding operations until May 20th, from when Le Huguenot, Firbank, Dart's Imperial were sown with 205lbs. superphosphate per acre. The rotation plots were sown from May 22nd to May 28th, and from that date until June 1st the following varieties:—Queen Fan, Baroota Wonder, Crossbred 53, Yandilla King, and Bearded Gluyas were drilled in with 219lbs. superphosphate to the acre, and so field No. 1 was completed. Field No. 12 took the remainder of the varieties sown, and they were put in from June 2nd to June 17th in the following order:—

Gluyas, with 205lbs. superphosphate per acre. Marshall's No. 3, with 200lbs. superphosphate per acre. Bayah, with 200lbs. superphosphate per acre. Thew, with 205lbs. superphosphate per acre. King's White, with 205lbs. superphosphate per acre. King's Early, with 205lbs. superphosphate per acre. Comeback, with 200lbs. superphosphate per acre.

The whole of this field was harrowed after the drill and most of it received a second harrowing after the saffron thistles had germinated.

The Firbank wheat sown in Field No. 1 germinated badly in places, so six acres were cultivated up and resown with Triumph wheat at the rate of 70lbs. seed per acre. The yields of these various varieties are shown in the following table:—

Wheat Variety Yields—Booborowie, 1915-16. Total Yield Variety. Area. Yield. per Acre. Acres. Bush, 1bs. Bush, 1bs. Queen Fan 1.36 48 38 35 46 Federation 43.821,470 14 33 33 Crossbred 53 11.86 367 11 30 58 29 28 Bearded Gluyas 219 52 28 44 632 - 328 36 168 9 Triumph 528 41 27 55 Thew 35.00 970 14 27 43 Gluyas 35.00 955 33 27 18 27 302 41 0 775 12 25 50 276 48 24 King's White 11.50 Firbank 177 53 23 41 American No. 8 23 20 5.60 130 40 312 57 22 21 Baroota Wonder 2.14 42 12 19 43 386 18 23 Bayah 7,765 2 19

The individual yields of these varieties shows the well known variety, Federation, well to the fore of all the others of which there was any decent area harvested. The highest yielder—Queen Fan—consisted of a comparatively small plot, but as the area was over one acre the recorded yield is worth noticing. This variety is a production of Roseworthy Agricultural College, and, on its performances since it first left that institution, is well worth watching in all districts where the mid-season wheats of about the growing period of Federation are suitable. Crossbred 53—a variety that does well in the hills near Adelaide—produced over 3½ bush. above the average yield. In suitable locations this variety produces wonderful hay crops of exceptional quality, and heavy crops of grain; it has the additional advantage of being practically rust-resistant.

This average yield of 27bush. 19lbs. is very creditable considering the number of varieties grown, and as the following table, setting out the wheat yields obtained at this farm since 1912 shows, it is nearly 2bush. above the 1912 yield and 9bush. above the farm average.

Wheat Returns-Booborowie, 1912-1915.

Year.	Total Rainfall. In.	Rainfall.	Area.	Total Yield. Bush, 1bs.	per Acre.	
1912	15.50	13.20	180.00	4,645 20	25 48	
1913	15.07	10.86	388.75	6,611 53	17 0	
1914	9.76	7.79	339.75	990 58	2 55	
1915	17.14	15.95	284.28	7,765 2	27 19	
Means	14.37	11.95			18 15	

The individual yields of all varieties grown have been carefully kept since 1913, and the following table will be of interest as showing how the varieties that have been grown continuously since then compare with one another and with the general farm average.

Yields of Wheat Varieties—Booborowie, 1913-1915.

·			•				Means	for	
Variety.	19	13.	19	14.	19	15.	Chree 1	Years	
	Bush	. lbs.	Bush	. 1bs	Bush	. 1bs.	Bush	ı. lbs.	
Federation	26	53	3	43	33	33	21	23	
King's Red	21	49	2	34	28	44	17	42	
Yandilla King	20	36	1	33	27	55	16	41	
Gluyas	18	2	3	16	27	18	16	12	
Marshall's No. 3	19	16	2	0	25	50	15	42	
Crossbred 53	12	27	1	4	30	58	14	50	
Thew	11	14	4	3	27	43	14	20	
Bayah	19	50	3	58	18	23	14	4	
American No. 8	16	34	2	16	23	20	14	3	
Firbank	14	14	1	35	23	41	13	10	
Comeback	15	7	1	44	22	21	13	4	
Triumph	- 5	26	. 1	36	28	36	11	53	
Farm averages	17	0	2	55	27	19.	15	45	
· ·	I	ı.	Ŀ	1.	In	1.	I	n.	
Total rainfall	15	07	9.	76	17.	14	13.	99	
"Useful" rainfall	10	86	7.	79	15.	95	11-	53	

These returns show for the three years—two of which were poor grain years—the well-known varieties, Federation, King's Red, Yandilla King, and Gluyas, to have yielded above the average of the farm for the period, and the equally well known Marshall's No. 3 with just the average yield. Considering the seasons under review this is another illustration of the general hardiness of the five varieties.

EXPERIMENTAL PLOTS.

Part of field No. 1 was divided into rotation plots before seeding, but as this was the first crop carried by any of the plots the results are only a record of yields of cereals with various quantities of manures. Below will be found the various rotation series as at present arranged, with the yields of the plots cropped:—

Rotation Plots—Booborowie, 1915.

					rieided
			and the second		per Acre.
Series I	•				Bush. 1bs.
	Bare fallow.			100	
	Wheat with 2cwts.	onnarnhaonhata			29 42
1 10 t 2.	William Will Zowos.	arber buoshrate			

Rotation Plots-Booborowie, 1915 -- continued. Yielded per Acre. Series 11 .--Bush, 1bs. Plot 3. Sorghum in spring. Plot 4. Wheat with 2cwts. superphosphate 34 11 Series III .-A.—Plot 5. Bare fallow. Plot 6. Wheat without manure 29 5 Plot 7. Pasture. B .- Plot 8. Bare fallow. Plot 9. Wheat with 1 cwt. superphosphate 37 9 Plot 10. Pasture. ('.-Plot 11. Bare fallow. Plot 12. Wheat with lewt, superphosphate 51 Plot 13. Pasture. D .- Plot 14. Bare fallow. E .- Plot 17. Bare fallow. Plot 18. Wheat with 3cwts. superphosphate 40 Plot 19. Pasture. Series IV .-A .- Plot 20. Bare fallow. Plot 21. Wheat with 2cwts. superphosphate 37 37 Plot 22.—Barley with 1cwt. superphosphate 47 B.-Plot 23. Bare fallow. Plot 24. Wheat with 2cwts, superphosphate 0 Plot 25. Oats with lewt. superphosphate 9 C.-Plot 26. Bare fallow. Plot 27. Wheat with 2cwts. superphosphate Plot 28. Peas with 1cwt. superphosphate 24 42 D .- Plot 29. Bare fallow. Plot 30. Wheat with 2cwts, superphosphate 52 Plot 31. Rape with lewt. superphosphate. Series V .-Plot 32. Bare fallow. Plot 33. Wheat with 2ewts. superphosphate 34 52 Series VI .-A-Plot 34. Bare fallow. Plot 35. Wheat with 2cwts, superphosphate Plot 36. Barley with 2cwts superphosphate 7 Plot 37. Pasture. B .- Plot 38. Bare fallow. Plot 39. Wheat with 2cwts. superphosphate 35 49 Plot 40. Oats with 2cwts. superphosphate 40 20 Plot 41. Pasture. Series VII .-Plot 42. Bare fallow. Plot 43. Wheat with lucerne and 2cwts. superphosphate 37 Plot 44. Lucerne. Plot 45. Lucerne. Plot 46. Lucerne. Series VIII .-Plot 47. Bare fallow. Plot 48. Wheat with rye grass and 2cwts, superphosphate Plot 49. Rye grass. Plot 50. Rve grass.

Varieties of Seed used.—Wheat—Federation, 60lbs. per acre; barley—('ape, 50lbs. per acre; oats—Algerian, 60lbs. per acre; peas—Early Dun, 100lbs. per acre; rape—Dwarf Essex, 4lbs. per acre; lucerne—Hunter River, 6lbs. per acre; rye grass—Italian. 10lbs. per acre; sorghum—Early Amber Cane, 7lbs. per acre.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF APRIL.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—The weather until the last week of this month has been fine and warm, with dewy nights. On the 21st a nice rain of 25 points fell, and unsettled weather followed. Crops—The farmers have not started sowing, the ground being in a bad condition for seeding operations. Natural Feed—Dry grass is plentiful. Stock—The continued dry weather has caused the early lambs to get a slight setback, the greenfeed, which is essential for breeding ewes, being lacking. In all probability a smaller area will be sown this year, and the greater portion of that on stubble land.

Eyre's Peninsula.—Weather—A very dry month has been experienced, less than 30 points of rain being registered, from light scattered showers, as against 118 points registered for April, 1915. The days have been mostly fine and calm, with a few frosty and foggy mornings. A good downpour is badly needed. Crops—Naturally conditions have not been favorable for seeding operations. A few acres of oats have been sown, as well as some small areas sown to the late wheat varieties, viz., Marshall's No. 3 and Yandilla King, but seeding has not yet begun in earnest. Natural Feed—There is still a fair picking of spear grass to be had on the open country. Water is scarce among the farmers, and the railways are delivering supplies to many.

Kybybolite.—Weather mild; light rains have been experienced throughout the month, about an even distribution of fine and showery weather; 207 points of rain was registered, but there was no heavy fall. Seeding operations for cereals is just commencing. Dry feed is still plentiful, and new grass is making satisfactory growth. Stock generally are in medium to good condition and healthy.

Turn tfield.—Weather conditions during April were typical of autumn, mild day temperatures with some cold nights; few sultry days were followed by light falls of rain. The total rainfall for the month was 1.03in., of which 30 points fell on the 25th of the month. Natural feed is going off, and paddocks where stock have been running are beginning to look bare. Stock, though still in good condition, do not appear to be deriving as much sustenance from the natural feed as in previous month, and stable feeding is being resorted to. Foxes are fairly prevalent, and poisoned baits have been laid with fair success. Cultivation of fallow land is in progress, and crops of rape and kale have been sown. Barley and oats are also being put in.

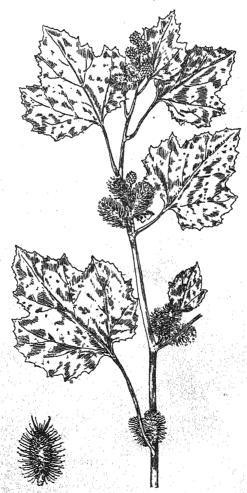
Veitch.—The rain gauge registered 20 points of rain, which is rather a dry month for this locality. We have had some heavy winds from the west during the month. Horses in good working condition; sheep looking well. Drilling operations are in full swing.

AN ALIEN WEED.

A WARNING TO SETTLERS ON THE RIVER MURRAY.

The attention of agriculturists, and more particularly those working on the lands adjacent to the River Murray, is directed to the occurrence at Renmark of a weed which threatens to become a very serious pest.

Some 12 months ago the Director of Irrigation found two burrs, about an inch long, and a fragment of a leaf, which were forwarded



Xanthium Canadense (Mill). From Experimental Station Bulletin-Michigan Weeds.

to Mr. J. M. Black. The plant of which these formed a part was said to be spreading rapidly near the Murray.

Mr. Black reported—"Although the specimen is defective, there is little doubt that we have to deal with the large fruited form of Xanthium canadense, sometimes treated as separate species under the names of X. macrocarpum and X. echinatum. It is an American weed, closely allied to the Bathurst burr (X. spinosum). The latter we know too well in South Australia, and another species (X. strumarium) has been recorded in the eastern States. Although of American origin, Xanthium canadense has established itself in some Mediterranean countries, and will do the same here unless energetic steps are taken to eradicate it. The new weed may not be a worse trouble to sheep than Bathurst burr, although the burrs are twice as large; but it will probably prove just as bad."

More complete specimens of this plant were secured a few weeks ago and submitted to the Consulting Botanist (Professor T. G. B. Osborn).

Professor Osborn says—''I fully concur with the remarks of Mr. Black as to the importance of taking this weed in time. People in districts likely to be infested should be urged to look out for and destroy the plant. Hoeing or handpulling can be done when young, or cutting with a seythe. If burrs are found, plants must be burned. X. spinosum is a noxious weed. This nearly allied species might be even more serious.''

IMMEDIATE ACTION TO DESTROY.

In view of the nature of the weed, and the probability of its rapidly becoming a very serious pest in this State, it was recognised that the only effective means of preventing its spread was immediate destruction. Acting under instructions of the Minister of Agriculture, an officer of the Irrigation Department is supervising the cutting out and burning of the weed on the affected area. By this means it is hoped to curtail, if not prevent, the distribution of this year's crop of seeds.

The Director of Irrigation says:—"The serious aspect of the matter is that the plant is growing in the Paringa paddock, where it was first discovered, and which land is subject to inundation, and in the event of it being allowed to seed, and such seed remaining undestroyed, at the first high flood the seed would be carried down stream, where it would find its way into the suction pipes of the various irrigation pumping plants, and also through the irrigation sluices on the reclaimed areas, and thus spread over the whole of the irrigation and reclaimed areas throughout the length of the river valley."

Landholders should, therefore, in their own interests, keep a sharp lookout for this pest.

Large areas of land in Australia have been very considerably depreciated in value owing to the spread of alien weeds. It is frequently contended that to eradicate some of these would involve an expenditure greater than the value of the land. However, it is admitted that had steps been taken to destroy the pests before they secured an extensive hold in the land, little trouble would now be experienced with them. In the case of X. conadense, these steps have been taken by the Government in the interests of the agricultural industry, and it is to be hoped that the landholders will second the action of the Government by immediately destroying any of these plants which may come under their notice.

THE EQUIVALENCE OF LIVESTOCK FOODSTUFFS AND FEEDING RATIONS.

By Arthur J. Paskins, Director of Agriculture.

(Continued from page 627.)

SHEEP

It is not, as yet, usual in South Australia to hand-feed sheep to any extent They are, as a rule, allowed to grow, fatten, and rear their lambs on pasture lands; and, unquestionably, the practice is cheaper than hand-feeding in any shape or form. Unfortunately, when rigorously adhered to, this practice involves in uncertainty the condition of the average sheep, which is apt to vary with the seasons. When the latter are favorable our sheep are fat and well covered; in times of drought, however, as we have recently had occasion to see, sheep are exceedingly fortunate if they escape with their lives. I am not here to argue that station practice should be changed, and that adequate provision should be made on sheep stations for hand-feeding sheep in times of scarcity; indeed, in present circumstances I believe that such a practice is neither practicable, nor if systematically practised likely to be profitable. We know, however, that if valuable strains are to be saved for future use studs must be hand-fed in times of drought, even on station property. The position of the farm sheep is, on the other hand, quite other; and I am of the opinion that the farmer whose farm is adequately stocked with sheep, and who would do justice to them, cannot escape a certain amount of hand feeding in almost any year. In this connection I have always held that whatever happens, whatever the character of the season, a farmer's flock ought never to be allowed to get below good store condition; and when we see the reverse to be the case we may conclude that it is a case of badly conducted business, the principal of which is not competent to handle it. It must be admitted that one occasionally sees attempts at hand feeding when the animals are practically in extremis. Such belated efforts, however, only serve to hasten on the inevitable end. And if it is true that in present circumstances the station owner cannot afford to store up foodstuffs indiscriminately in anticipation of uncertain drought periods, it is equally true that the farmer who is not prepared to hand feed his sheep whenever occasion arises, had better confine his energies to wheat growing.

There are, as I have already stated, few seasons in which the hand feeding of sheep can altogether be avoided on the average South Australian farm. In spite of intense heat, so long as the stubbles are fresh and sweet, sheep retain condition through the waning summer months, and if rationally treated should be in prime condition by early March. Subsequently, however, March and April are always likely to be critical months for sheep; by that time dry feed is usually exhausted, or else soiled beyond use, and new feed does not become available until the autumn rains have definitely broken down droughty summer conditions. And, however good the condition of sheep in the early days of March, unless they are hand fed to a certain extent at this stage, they are always exposed to entering upon the cold wet winter months in low condition, and this is fatal to the wellbeing of the flock and to the pocket of the farmer. Early winter lambing is the rule over the bulk of the State, and if the ewes are poor when the lambs are dropped they have absolutely no chance of recovery whilst the lambs are upon them; in many cases, indeed, they will lack strength to rear their lambs, and the latter will either perish for lack of nourishment or else linger on gaunt, unsaleable rıînts.

Hence there are few seasons in which a certain amount of judicious hand feeding can be avoided in the months of March and April; and frequently, when the rains are late, it must be extended into May and June. In this connection the mistake is often made of deferring hand feeding until all natural grazing has been completely exhausted; in the meanwhile sheep lose condition, which can only be regained at considerable expense to the farmer. Hand feeding should, as a rule, be put in hand early in the season whilst some grazing is still available; it then becomes an adjunct to grazing and not the only source of food supplies; and although extending over a greater period of time it becomes, on the whole, less expensive. On no consideration should hand feeding be deferred till actual lambing time, when the greater part of the damage from under-feeding will already have been done.

It seems unnecessary to add that nobody can take up hand feeding to advantage unless adequately provided with troughing and all that is necessary to the purpose. And since, on any farm, hand feeding is unavoidable the full requirements of the case should be thought out and provided for many

months ahead; nothing but waste and loss will result to those who endeavor to improvise everything on the spur of the moment, when hand feeding can no longer be dodged. There is no gainsaying the fact that hand feeding cannot be handled to best advantage at the first try, and it is certain that farmers who practise it in moderation in most seasons will, in times of drought and searcity, find themselves otherwise well equipped than those who have failed to serve their apprenticeship under more favorable auspices.

MAINTENANCE RATIONS.

When hand feeding is resorted to, because natural pasture and forage crops have been exhausted, or because it is foreseen that they will shortly become exhausted, the object in view is not the fattening up of animals for market, but the protection of the good condition which they have acquired earlier in the season. And, in the circumstances, it is a maintenance ration and not a fattening ration that is fed to them. When animals of any kind are being fattened for market, providing one guards against waste, there is no advantage in limiting the amount of food consumed in a day. the quantity consumed, assuming the ration to have been adequately built up, the more rapid, and in the end the cheaper, will the fattening process be. With a maintenance ration, on the other hand, it is quite otherwise. In the case of sheep, a suitably calculated maintenance ration is expected to provide for the continuous growth of wool and horn, the performance of normal bodily functions, and the renewal of any waste in bodily tissues that may arise. Beyond this it does not aim. And any increase in body weight, beyond what may be accounted for by the growth of wool, such as the accumulation of fat, is never contemplated.

According to Kellner the requirements of sheep in the way of maintenance ration per 1,000lbs live weight are represented by starch equivalent, 8-3lbs.; digestible crude protein, 1-2lbs.; total dry matter, 18lbs. to 23lbs. Now, according to breeds, the average live weight of sheep vary within very wide limits. Individual animals of the British breeds, for instance, frequently exceed 200lbs. in live weight whilst the store weight of the average Merino wether will probably not exceed 100lbs. And it is on the 100lbs. basis that the various rations indicated below have been built up. They may be increased or reduced according to the size and type of sheep.

If a 100lbs, sheep be fed on wheat hay chaff alone its proper daily maintenance ration would, according to Kellner's data, be represented by 23lbs. Such a ration, however, is not altogether satisfactory since, whilst providing an excess of dry matter, it is deficient in protein, so essential to sheep for efficient wool building.

Below, in Table XXIII., I have summarised a series of maintenance rations for sheep whose store live weight averages 100lbs. These rations have been calculated out for usual available foodstuffs on Kellner's data.

Table XXIII.—Summarising Maintenance Rations per diem for Hand-fed Sheep of 100lbs. Store Live Weight.

Nos	š.	Lbs.		Lbs.		Lbs.
. I.	Wheat hay chaff .	$2\frac{1}{4}$	Crushed pease	1		
II.	Wheat hay chaff .	$2^{^{-}}$	Copra cake	4	-	
	Wheat hay chaff .	2	Bran			
	Wheat hay chaff .	$1\frac{3}{4}$	Lucerne hay	\$	Carob meal	1
	Wheat hay chaff .	13	Pollard	$\frac{1}{2}$		
	Wheat hay chaff .	13	Lucerne hay	ۇ	Crushed maize	1
	Wheat hay chaff .	12 12 12 14	Crushed pease	ł	Crushed maize	큪
	Wheat hay chaff .	14	Lucerne hay	1/2	Crushed barley	2
	Wheat hay chaff	14	Bran	—हिरा −हिरा नहिरा	Crushed maize	
	Wheat hay chaff .	1 <u>1</u> 1 <u>1</u>	Pollard	1/2	Crushed maize	4
	Wheat hay chaff .	14	Pollard	. 4	Crushed oats	<u>\$</u>
	Wheat hay chaff .	$1\frac{1}{4}$	Bran	4	Crushed oats	2
	Wheat hay chaff .	11	Crushed oats	4	0 1 11 1	
	Wheat hay chaff .	1	Bran	2	Crushed barley	- c1- c1- c1- c1
	Wheat hay chaff .	1,	Pollard	호	Crushed barley	2
	Wheat hay chaff .	3 ²	Bran	2	Crushed maize	2
XVII.		$\frac{2}{1}$	Crushed pease		Crushed maize	3
AVIII.	Barley straw	11	Pollard	1	Constant banks	1
AIA.	Barley straw	$1\frac{1}{2}$	Bran	1 1 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Crushed barley	3
XX.	Barley straw	$\frac{1}{2}$	Crushed oats	1 8		
	Wheat straw		Copra cake	4 3	Carob meal	3
	Pea haulms	15	Lucerne hay	, #	Carob mear	$\frac{3}{4}$
	Pea haulms	$1\frac{1}{2}$ $1\frac{1}{2}$	Barley	. B	,	
	Green sorghum		Marze	$\frac{3}{4}$		
XXVI.		9				
XXVII.	Green maize	7	Green lucerne	$2\frac{1}{4}$		
XXVIII.	Mangolds	11	Barley straw	- 46		
XXIX.			Barley straw			
XXX.	Swedes	10	Wheat straw	i		
*****	DITUMOD TELETIFICA		(1210W0 DOEWH ***	•		

It is not to be inferred that these suggested maintenance rations are absolutely definite and binding; much has to be allowed for individual idiosyncrasies in animals; much for variations in composition of the food-stuffs supplied. And let it be understood that the rations imply, in all cases, the use of first class material in good state of preservation: That when, for instance, straw is indicated, good, sound, clean straw is implied, and not old thatch which has been knocking about for years in a variety of offices.

MILCH COWS.

The Dairy Expert, Mr. P. H. Suter, is a very consistent advocate of good feeding for milch cows. And it would appear that locally, like sheep, the former are, both figuratively and literally, on clover for very limited portions of the year only; and yet the under feeding of milch cows is far more glaringly costly than is the case with sheep, since the practice which shuts off the supply of milk has similar and corresponding action on the dairyman's immediate income. And it seems curious that he should appear at times to view such a contingency with apparent equanimity. I have, however, no intention of encroaching on Mr. Suter's special domain. I wish merely to remark that with milch cows, apart altogether from the question of size, feeding should be in proportion to the daily milk yield. The production

of milk is a heavy drain on the system of the cow, and heavy milkers, if they are to continue profitable, should be fed accordingly.

I have already indicated, in Table XVI., Kellner's standards for milch cows, and by way of illustration I shall content myself with drawing up eight typical rations in Table XXIV.

It should, perhaps, be pointed out at first, that if we attempt to feed milch cows on wheat chaff alone—an altogether unsuitable ration—and also take starch equivalents alone into consideration, the daily requirements of a 1,000lb. cow, according to milk yield, would be as follows:—For 10lbs. milk daily, 24lbs. of chaff; for 20lbs. milk daily, 30lbs. of chaff; for 30lbs. milk daily, 36lbs. of chaff.

The objection to these chaff rations is that all of them are insufficiently supplied with digestible protein, and the last ration is in addition overcharged with dry matter.

Table XXIV.—Showing two Typical Rations for 1,000lb. Milch Cows with varying Milk supplies.

		DAILY MILE	YIELD.	
I.	10lbs.	20lbs.	301bs.	40lbs.
Wheat hay chaff	20	22	21	14
Lucerne hay	6	11	10	10
Bran			6	10
Copra cake		-		3
II.				
Green lucerne	30	40	40	45
Wheat hay chaff	17	20	18	14
Bran	41		6	7
Copra cake		-	-	3

PIGS.

There are no animals that put their food to better use, from man's point of view, than pigs. They store up in their bodies a higher proportion of the dry matter consumed than any other domestic animal. Their relative feeding powers, however, vary considerably with their age and size. In principle, when pigs are being fattened, the food supplied to them should be gauged by their appetites alone; it being understood, however, that waste must always be avoided.

Kellner's standards for fattening pigs of various weights and ages are as follows:—

Table XXV.—Showing Kellner's Standards for Fattening Pigs of various Weights and Ages per 1,000lbs. Live Weight.

Age.	Weight.	Starch Equivalent.	Digestible Crude	Total Dry Matter.
Months.	lbs.	lbs.	Proteim. lbs.	lbs.
2-3	44	33.8	6.6	44.0
3-5	80-110 120-145	$32.0 \\ 26.5$	4·5 3·5	$36.0 \\ 32.0$
6-9	175-200	24·5	3·9	28·0
9-12	250-285	19.8	3.2	25.0

I have summarised below, in Table XXVI., a series of rations based on Kellner's Standards for Pigs averaging respectively 80lbs. (porkers), 150lbs. (light baconers), and 200lbs. (heavy baconers).

Table XXVI.—Showing approximately Equivalent Daily Ra ions for Porkers (80lbs.), Light Baconers (150lbs.), and Heavy Baconers (200lbs.).

Nos.	Rations.	Porkers.	Light Baconers.	Heavy Baconers.
T Church	ned wheat	31.	lbs. 5‡	lhs. 63
		-	-	-
	ned wheatrd	$\frac{2}{2}$	$\frac{4}{2}$	$\frac{5}{24}$
	ned wheat	$\frac{2\frac{1}{2}}{1\frac{3}{4}}$	$\frac{4\frac{1}{4}}{2}$	$\frac{5\frac{1}{2}}{2}$
		•	_	_
	ned barleyrd	$\frac{1\frac{1}{2}}{3}$	$\frac{2}{5}$	3 5 1
	ned barley	$\frac{2\frac{1}{4}}{2\frac{3}{4}}$	$\frac{3\frac{1}{2}}{4}$	$\begin{smallmatrix}4\frac{1}{2}\\5\end{smallmatrix}$
VI. Crush	ned barleyned pease	$\frac{1}{2}$	$\begin{array}{c} 4 \\ 2\frac{1}{4} \end{array}$	$\begin{array}{c} 5 \\ 2\frac{3}{4} \end{array}$
	hed oats	$\frac{2\frac{1}{2}}{2}$	$\frac{4}{3}$	$\frac{5}{3\frac{1}{2}}$
	hed oatshed pease	3 1 1	4 <u>1</u> 1 <u>3</u>	6_2
	hed maize	$\begin{array}{c} 1\frac{1}{2} \\ 2\frac{1}{2} \end{array}$	$\frac{2\frac{1}{4}}{4}$	3 <u>1</u> 3 <u>1</u>
	hed maizehed pease	13 13	3 <u>1</u> 1 <u>3</u>	$\begin{array}{c} 4 \\ 2\frac{1}{2} \end{array}$

GENERAL CONCLUSIONS.

And thus comes to an end what was originally intended for a paper to be read at the 1915 Congress. By way of conclusion it may be stated that none of the figures and rations given in these papers must be interpreted too strictly; they represent, on the whole, fairly accurate average data. But in individual cases, neither animals nor foodstuffs necessarily conform to averages, and it is for the skilful feeder to watch and gauge the special requirements of his livestock. What I had specially in view, however, was to show that it is now possible to compare on a fairly definite basis various types of foodstuffs, and that, hence, the feeder of livestock, who is accustomed to one type of foodstuff is not compelled to adhere to it when it shows signs of attaining to fancy prices. It is always open to him to fall back on other less known and less costly foodstuffs of equivalent value. Perhaps, too, the importance of making greater use of the more concentrated forms of foodstuffs will also be realised by owners of livestock generally. It is certain that in judicious combination with coarser foodstuffs they represent, as a rule, both cheaper and more efficient feeding material.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, April 5th, there being present Messrs. C. E. Birks (in the chair), G. R. Laffer, M.P., A. M. Dawkins, George Jeffrey, C. J. Tuckwell, J. Miller, W. J. Colebatch, T. H. Williams, and Geo. G. Nicholls (Secretary). An apology was received from Professor Perkins for unavoidable absence.

Cornsacks.—The Secretary reported that the Minister of Agriculture intended to introduce the question of the supply of cornsacks for next harvest at the Conference of State Ministers of Agriculture, to be held in Sydney this month.

Shoot Scorchers.—The Board appointed a committee, consisting of the Director of Agriculture, Mr. Laffer, and the Secretary, to go into the matter of a trial of shoot scorchers, and if possible to arrange such a test.

Free Railway Tickets for Delegates to Country Conferences.—The Branch at Frances desired that free railway tickets should be supplied to the delegates attending district conferences of the Bureau. The Board decided that it could not agree to any change being made.

Annual Congress.—At the instance of Mr. Laffer, it was resolved to hold a Congress this year, and the Chairman, Director of Agriculture, Principal of Agricultural College, and the Secretary were appointed as a committee to make the necessary arrangements.

Tick-Infested Sheep.—The Chief Inspector of Stock quoted examples of the uselessness of employing non-poisonous carbolic dips for sheep. These would never give satisfactory and lasting results. He strongly urged all stockowners to use only poisonous dips. Several members expressed the opinion that the sale of non-poisonous dips should be prohibited.

Life Membership.—On the recommendation of the Crystal Brook Branch, Mr. B. Flavel was appointed a life member.

Branch at Brentwood.—The formation of a new Branch of the Bureau at Brentwood, on Yorke's Peninsula, was approved, with the following gentlemen as members:—Messrs. J. J. Horner, C. Newbold, E. J. Lehmann, A. Babbage, H. T. Hagger, H. Ross, W. Boundy, W. Alderman, F. Nation, C. Boundy, S. Alderman, G. J. Martin, A. Anderson, G. L. Tucker, A. Twartz, A. Longbottom.

New Members.—The following gentlemen were approved as members of the undermentioned Branches:—Longwood—R. Kerr, A. Horner; Murray Bridge—W. Pollard, T. Parish, A. T. Potter, G. Jaensch; Wilkawatt—W. Neville, sen., A. Morgan; Strathalbyn—A. Woolfitt; Cherry Gardens—Kenneth Jacobs; Naracoorte—Gilbert Wright, E.

Wagner, A. C. DeGaris; Ramco—C. Train; Berri—B. Kurtz; Lyndoch—W. J. Glasson, N. G. Zimmermann; Hawker—N. G. Ogman, A. C. Hilse, O. G. Bartholomaeus, G. Moller, W. J. Ogman, A. I. O'Brien, B. Hadaway, H. Cannell, G. B. Smith, H. C. Condon, J. F. Pumpa; Mount Barker—A. W. Jones, O. P. Lines; Morchard—H. Brown; Rosy Pine—A. Sands, M. G. McCabe; Yaninee—Hugh Brown, Len. Hicks; Halidon—W. R. Nelson; Mypolonga—A. Angraves, S. Davey, T. E. Turner, S. Cameron; Netherton—E. S. Brown; Pirt Pirie—A. W. Noll, T. Webb; North Booborowie—W. S. Murray, J. Thomas, B. H. Woodgate, W. H. Richards; Kanmantoo—W. J. Pym; Bute— T. Trengrove; Woodleigh—Alb. Paech; Goode—A. S. Watson.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on May 1st:-

BUTTER.—Supplies continue to show a seasonable shrinkage, and this State is still importing a large proportion of its requirements from the eastern markets. The rates ruling at these latter places, therefore, directly influence values here. Quotations have steadily advanced, the month closing with "Alfa," 1s. 7½d.; "Primus," 1s. 6d.; choice separators and dairies, 1s. 4½d. to 1s. 5½d.; store and collectors", 1s. to 1s. 2d. per 1b.

EGGS.—Owing to the shortage in supplies, and the absence of cold stored offering, prices are considerably higher than they were a month ago. There is no export trade being done at present, the local demand being sufficient to absorb all coming forward. Hen eggs, Is. 11d.; duck, 2s. per dozen.

CHEESE.—Large quantities are arriving from the South-East, but with good local inquiry, also strong W.A. buying orders, fair prices have ruled throughout, present values being from 9d. to 9\frac{4}{3}d. per lb. for large to loaf.

BACON.—Market is easier, as supplies of the live hog have increased extensively. Best factory-cured sides, 1s. 0½d. to 1s. 1½d. per lb.; hams, 1s. 2d. to 1s. 3d. per lb.

HONEY.—Although the forwardings have been heavy, market has well maintained, prime clear extracted selling at 5½d. to 5¼d. per lb.; second grades, 4½d. to 5d.; beeswax, 1s. 5d. to 1s. 6d. per lb.

ALMONDS.—The consignments have not been nearly equal to requirements, and, in fact, many export orders have had to be refused. Brandis, 8½d.; mixed softshells, 7½d.; hardshells, 3½d.; kernels, 1s. 6d. per lb.

LIVE POULTRY.—Quite Easter markets have been experienced throughout the month, with values well maintaining. Good table roosters, 3s. 9d. to 4s. 3d. each; nice-conditioned cockerels, 2s. 6d. to 3s.; light birds, 1s. 8d. to 2s. 2d.; ducks, 3s. to 4s.; geese, 4s. to 4s. 9d.; pigeons, 7d.; turkeys from 9d. to 11d. per lb. live weight for medium to good table birds.

POTATOES AND ONIONS.—Potatoes have been purchased freely from the Gippsland district, Victoria, where crops are reported to be very heavy. There has been little improvement in local supplies, but prices are easier on account of the lower quotations coming through from the other States. ONIONS.—Local supplies continue to be short of requirements; stocks there have to be supplemented by importations from the Colac district, consequently prices are governed by rates ruling in Victoria. Quotations:—Potatoes, £8 to £8 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide; onions, £5 to £5 10s. per ton of 2,240lbs. on trucks Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of April, 1916, also the average precipitation to the end of April, and the average annual rainfall.

Station.	For April, 1916.	To end April, 1916.	Av'ge. toend April.	Av'ge. Annual Rainfall	Station.	For April, 1916.	To end April, 1916.	Av'ge. to end April.	Av'ge. Annual Rainfal
FAR NORTH	and U	PPER N	ORTH.		Lower	 Повтн-	-contin	ued.	
Oodnadatta	0.03	2.52	0.20	4.76	Spalding	1.08	2.15	1.14	20.2
Carcoola	0.05	0.05	0.27	7.58	Gulnare	0.96	2.02	1-11	19.74
Hergott		().39	0.44	6.04	BundaleerW.Wks.	1.11	2.73	1.10	17.2
Farina	0.15	0.69	().41	6.70	Yacka	0.55	1.44	1.36	15.2
Leigh's Creek	No. Company	0.26	0.58	8.66	Koolunga	0.53	2.14	1.40	15.9
Beltana	Water Special	0.56	0.58	9.22	Snowtown	0.63	1.72	1.44	15.7
Blinman	Marrier A	0.34	0.87	12.83	Brinkworth	0.66	1.88	0.97	15.4
Hookina		0.52	0.32	'	Blyth	0.88	2.99	1.55	16.3
Hawker		0.21	0.86	12.22	Clare	1.49	3.24	2.09	24.3
Wilson	0.92	0.02	0.85	11.78	Mintaro Central .	1.39	2.68	1.71	21.9
Gordon		0.24	0.35	10.26	Watervale	1.56	2.92	2.55	27.1
Quorn		0.15	1.01	13.78	Auburn	1.56		2.02	24.2
Port Augusta	0.10	0.85	0.81	9.46	Hoyleton	1.05	1	1.78	17.9
Port Augusta W.	0.03	0.71	0.79	9.36	Balaklava	0.64	1	1.66	16.0
Bruce	0.02	0.10	0.38	10.01	Port Wakefield	0.53		1.32	
Hammond	0.03	0.18	0.93	11.46	Terowie	0.28		1.03	13.7
Wilmington	0.22	0.68	1.53	18-26	Yarcowie	0.43	1	1-06	13.9
Willowie	0.02	0.13	0.68	11.90	Hallett	0.44	1	1.30	16.4
Melrose	0.47	0.94	1.75	23.04	Mount Bryan	0.74		1.04	
Booleroo Centre	0.28	0.46	1.30	15.83	Burra	0.84			1
Port Germein	0.11	0.52	1.27	12.84	Farrell's Flat	1.28			
Wirrabara	0.44	1.05	1.61	18.91	Parton a Plant	1 1 -0	1 227	1 1.00	1 10 0
Appila	0.26	0.46	1.29	15.08	Wan	. m M	RAY R		
Cradock		0.05	0.71	10.86					
Carrieton	0.01	0.43	0.82	12.22	Manoora	1.56		1	
Johnburg	0.01	0.47	0.61	10.21	Saddleworth	1.22			
Eurelia		0.68	0.95	13.24	Marrabel	1.90			
Orroroo	0.12	1.21	1.01	13.42	Riverton	1.95			1
Black Rock		1.04	0.95	12.25	Tarlee	1.54			
Petersburg	0.27	1.14	1.03	13.07	Stockport		1	1	,
Yongala	0.28	0.76	1.11	13.94	Hamley Bridge	1.06			
Tongona,	1 0 20	1 0-10	1 113	1 .00.	Kapunda	1.73		1	
N	овтн-1	CAST.			Freeling	1.70			1
Ucolta		0.71	0.35	1	Greenock	1.25			
Nackara		0.77	1		Truro	1.29			
Yunta		0.11	0.54	8.22	Stockwell	0.87			
Waukaringa		0.06	0.50	7.94	Nuriootpa	1.25			
Mannahill		0.31	0.66	8.46	Angaston	1.29			
Coekburn		0.04	0.53	7.97	Tanunda				
Broken Hill, NSW	0.05	0.19	0.67	9.63	Lyndoch	1.20	2.87	2.11	23.0
	WER N	1.	4		Ane	LAIDE	PLAINS	'	
	1 0.21		1 1 0=	1 79 91		1.30			16.8
Port Pirie	0.68	0.60	1.35		Mallala			1.03	
Port Broughton .		1.54	1.46	14.33	Roseworthy	1.32		1	
Bute	0.90	1.75	1.47	15·42 18·22	Gawler	1.27			
Laura	0.52	1.13	1.60		Two Wells	0.79			
Caltowie	0.75	1.70	1.42	17.27	Virginia	1.06			1
Jamestown	0.63	1.29	1.37	17.46	Smithfield	1.07			
Gladstone	0.66		1.49		Salisbury	1-13			ŧ
Crystal Brook	0.68	4.7.7	1.46	15.62	North Adelaide	1.63	4	1.92	
Georgetown	0.78	1.50		18.32	Adelaide	1.51			
Narridy Redhill	0.39			16.79	Brighton Glenelg			1.61	
		1.74	1.55	16.79	1-leneir	1.23	2.34	1.64	18.3

RAINFALL-continued.

			RAIN	FALL-	continued.				
Station.	For April, 1916.	To end April, 1916	Av'ge. to end April.	Av'ge. Annual Rainfall	Station.	For April, 1916.	To end April, 1916.	Av'ge. to end April.	Av'ge. Annual Rainfali
Adriaide	Pr.atw	s-cont	inaced.		W 0		~		
				1 0 = 00	West of Spen	CEB'S	JULE	continue	d.
Magill	1.38 2.42	3.03 4.44	2·38 2·44	25·69 25·26	Streaky Bay	0.39	1.02	1.11	15.31
Glen Osmond	2.42	3.33	2.17	23.47	Port Elliston	0.68	1.93	1.16	16.49
Mitcham Belair	2.18	3.35	2.64	28-64	Port Lincoln	1.40	1.91	1.56	19.88
Delan	<u> </u>	1 0 00	201	20 01	Tumby	0.90	1.40	1.22	15.00
Mount	LOFTY	RANG	es.	ĺ	Carrow	0.45	0.95	1 20	11.76
Teatree Gully	1.83	3.72	2.46	28-19	Point Lowly	0.23	0.68	1.39	11.76 12.21
Stirling West	4.20	6.20	4.13	46-70	Lowing	0 40	1 1-20	1 0.90	1221
Uraidla	3.85	5.88	3.76	44.35					
Clarendon	3.52	5.11	3.09	33.67	YORKI	e's Pe	NINSUL	A.,	
Morpheit Vale	2.21	3.69	2.19	23.32	Wallaroo	1.04	2.39	1.38	14.05
Noarlunga	1.60	2.60	1.90	20.28	Kadina	0.72	1.70	1.67	15.88
Willunga	1.44	3.72	2.11	25.98	Moonta	0.94	1.93	1.69	15.22
Aldinga	1.34	2.33	1.77	20.34	Green's Plains	0.89	1.86	1.47	15.73
Normanville	1.70	2.66	1.83	20.65	Maitland	1-40	2.17	1.96	20.08
Yankalilla	1.62	2.83	2.03	22.78	Ardrossan	0.68	1.48	1.32	13.89
Cape Jervis	0.58	1.22	1.40	16.34	Port Victoria	1.21	1.72	1.54	15.20
Mount Pleasant .	1.66	4.03	2.27	26.87	Curramulka	1.15	2.49	1.59	18.51
Blumberg	1.72	3.20	2.46	29.38	Minlaton	1.46	1.96	1.62	17.41
Gumeracha	2·13 2·58	4·19 3·95	2.72 2.91	33·30 35·38	Stansbury Warooka	0.97	1.60 1.68	1.54	17.06 17.71
Lobethal	2.05	3.93	2.43	31.87	Yorketown	1.24	1.65	1.55	17-47
Woodside Hahndorf	2.99	4.63	2.80	35.45	Edithburgh	1.33	2.10	1.56	1
Nairne	2.02	3.25	2.34	28.83		1 . 50	1 2 10	1 100	10 10
Mount Barker	2.90	4.75	2.35	30.93	South	AND S	Trong R	A CITT	
Echunga	2.45	3.89	2.81	32.83			_		(
Macclesfield	2.60	4.07	2.62	30.72	Cape Borda	2.16		2.04	
Meadows	2.96	4.56	3.16	35.52	Kingscote	0.99	1.89	1.49	18.95
Strathalbyn	1.41	2.50	1.51	19.28	Penneshaw	1.20	2.57	1.65	
					Cape Willoughby.	1.00	3.91	1.86	19.69 22.18
Murray	FLATS	AND VA	LLEY.		Port Elliot	1.34	2.24	1.73	20.33
Wellington	0.99	1.76	1.37	15.01	Goolwa	1.69	3.33	1.50	17.93
Milang	1.01	1.86	1.46	16.08	Pinnaroo	0.70	1.63	0.83	16.74
Langhorne's Brdg	1.32	1.94	1.32	15.27	Parilla	0.46	1.87	1 -	
Tailem Bend	0.82	1.31	0.73		Lameroo	1.22	2.55	1.25	16.55
Murray Bridge	0.77	1.53	1.37	14.32	Parrakie	0.84	1.39	0.57	-
Callington	0.63	1.39	1.33	15.65	Geranium	1.27	1.94		
Mannum	0.93	1.86	1.14	11.67	Peake	0.95	1.54	0.87	10.74
Palmer	0.90	1.93	1.03	15.60	Cooke's Plains	1.51	2.14	1.19	14.74
Sedan	0.41	1.46	1.07	11.92	Meningie	2.19	2.97	1.61	17.49
Blanchetown Eudunda	1.07	0.85 2.04	0.86 1.44	10·71 17·33	Coonalpyn	1.07	1.98	1.12	1
Sutherlands	0.37	1.57	0.57	10.60	Tintinarra	2.00	2.74	1.56	
Morgan	0.12	0.66	0.73	9.29	Keith	1.41	2.07	1.33	
Overland Corner	0.11	0.32	0.95	11.42	Bordertown	1.34	3.01	1.76	19-76
Renmark	0.05	0.48	0.77	10-93	Wolseley	1.22	3.19	1.75	17-72
Loxton	0.25	0.86			Frances	1.03	2.63	1.65	20.74
		· .		·	Naracoorte	1-98	3.62	1.88	22.60
Winder or	ST.	mm'a A	***		Penola	2-00	4.30	2.01	26.78
West of					Lucindale	2.66	4.41	1.95	
Eucla	0.51	I.54	1.13	10.13	Kingston	2.09	3.76	2.05	
White Well	0.28	1.75	0.50	9:67	Robe	2.80	5.41	1.87	24.69
Fowler's Bay	0.26	0.69	0.90	12.11	Beachport	3.16	4.30	2.14	27.51
Penong	0.28 0.45	0.90	0.83	11.93	Millicent	$\begin{vmatrix} 3.00 \\ 2.71 \end{vmatrix}$	5.82 5.64	2.50	32.00
Smoky Bay	0.42	0.69	0.40		Mount Gambier . C. Nrthumberland	2.89	5.51	1	A second second
-mount way	0.42	1 0.04			. Minimumorialiu	2-09	1.0.01	1 210	1 -5 99
# 50 5 4 11 M - 4 10 10 10 Mg/m/mm/mm/mm/mm/mm/mm/mm/mm/mm/mm/mm/mm/				1		1			

THE AGRICULTURAL BUREAU.

CONFERENCE OF NORTHERN YORKE'S PENINSULA BRANCHES.

(Continued from page 830.)

THE NEED FOR GREATER PRODUCTION BY PRIMARY PRODUCERS.

In a paper under this heading, Mr. T. B. Brinkworth, of the Paskeville Branch, drew attention to the necessity for developing the State's industries in order to finance the war, and meet the fast growing monetary obligations of the Commonwealth. After quoting statistical data, the writer of the paper expressed the opinion that the wheat production could be much increased if farmers as a whole would give more attention to early fallowing, opportunely worked, selection of seed, and heavier dressings of manures. The dairy and poultry industries were capable of considerable development. He contended that the meat export industry was the one to which they could look for the greatest expansion. To make the most of this, small paddocks would be necessary, and recourse to such fodders as barley, oats, rye, rape, and when these failed hand-feeding from stacks of fodders conserved in years of plenty. Whilst this might present difficulties, he did not think these insuperable.

~19016E~

CONFERENCE OF LOWER EYRE PENINSULA BRANCHES.

The Branches of the Agricultural Bureau situated on the Lower Eyre Peninsula met in conference at Yeelanna on Monday, April 3rd. The Director of Agriculture (Professor Arthur J. Perkins), the Superintendent of Experimental Work (Mr. W. J. Spafford), the Chairman (Mr. F. Coleman), and Acting Secretary (Mr. H. J. Finnis) of the Advisory Board represented the Department of Agriculture, and the following delegates attended on behalf of the Branches named:—Yeelanna—S. A. Wilkin, J. J. Cronin, J. A. Dunn, T. H. Proctor, W. D. Wemyss, P. Kain, W. E. Nosworthy, R. F. Brown, H. C. Roediger, I. J. Williams, J. P. Cronin, T. B. Cronin, W. Watkins, J. M. Carey, E. Behenna, H. Glover, J. Cronin, sen., W. V. Bache; Yaninee—F. Christian; Koppio—J. Newell.

W. R. Richardson; Mitchell—H. H. Voumard, A. Ashman, D. T. Sampson, J. H. Vigar; Yallunda—F. Olston, G. A. Teakle, together with a number of visitors.

In response to the request of the chairman (Mr. G. W. Proctor, President of the local Branch), Mr. Coleman opened the Conference. In addressing the gathering, he said the quantity of grain carried by the railway in the district was a striking indication of the possibilities of the country. The development of the latent agricultural resources would be the surest means of securing for them improved transport facilities. They were meeting difficulties, an important one being the development of takeall in the crops, but the best method he could suggest for overcoming these was to meet, as they were doing that day, and discussing these problems.

MARKETING FARM PRODUCE.

In a paper on this subject, Mr. W. Vigar, of the Mount Hope Branch, mentioned the difficulty producers on the Peninsula had in marketing such lines as butter, eggs, meat, wool, skins, etc. This was largely due to the handling involved in transport between the farm and the market in Adelaide. He suggested the need for an arrangement under which the producer could put his goods on rail and land them in the city for an overall charge. In addition to other cases, he mentioned that the cost of getting sheep to the Adelaide market was about 4s. per head. The establishment of a stock market on the Peninsula might overcome this.

In discussing the subject, Mr. J. Cronin (Yeelanna) endorsed the opinions expressed by the writer of the paper, and later moved the following resolution, which was seconded by Mr. Vigar and unanimously adopted by the Conference:—"This Conference is of the opinion that the Government should either provide for a State line of steamships between Adelaide and Port Lincoln, or make provision for the through carriage of goods from Port Adelaide to any station on the Eyre Peninsula railways, with a through booking charge."

TAKEALL.

Mr. J. J. Cronin, of the Yeelanna Branch, in a paper dealing with this subject, said—That this disease attacks some cereals and not others should go a long way in solving the problem. The fact that it is possible to grow a crop of oats on land affected by takeall has enabled dozens of farmers on the West Coast to carry on. In my opinion takeall can be checked a good deal if the farmers take the trouble to watch the particular herbage that grows on the land prior to sowing with wheat. For instance, a farmer soon becomes acquainted with

the weeds, etc., which the disease thrives on, such as thistles, etc. If a paddock of fallow is covered with thistles it is fairly certain that if it is sown with wheat takeall will result. The object then should be to work or eat off these plants. I do not know whether any particular season favors the development of takeall, but judging from the last season, it certainly looks as if a normal year, following two dry ones, encourages it, whilst the fact that farmers last season sowed ground because it produced next to nothing the year before may have been an encouraging factor. The reason that takeall is so bad in mallee land is that farmers have to sow so often in succession to enable them to keep the shoots down. With our present method of killing shoots, it is necessary to have a crop of stubble on the land, and most farmers like to get a burn on the shoots as soon as possible after the scrub is first knocked down. Consequently the result is two, or, in some cases, three crops of wheat in succession, and the result of this successive cropping is that the land becomes affected with takeall, which takes years to get out. I advise farmers to keep fallow bare, either with sheep or by disc harrowing or cultivating. This is the only way to successfully cope with the disease. A rotation of oats and wheat is advisable; also to keep the shoots down as much as possible is a good idea. Sheep on the farm will go a long way in checking the disease.

DISCUSSION.

A vigorous discussion followed the reading of the paper. Mr. J. Carey, whose crops had suffered considerably from this disease, thought the only means of combating it was to substitute oats for the wheat crop. However, they were not assured of a good market for oats. Mr. W. R. Richardson said oats had had no apparent effect in checking the disease; sheep would be found more successful. Mr. S. Wilkin had a crop of oats affected with takeall. The year previously the land in question carried wheat, which was a complete failure. It was noticeable that where oats were affected there was a vigorous growth of thistles. Growing oats and cutting them with the binder was not a satisfactory way of handling the crop; it was necessary to secure a good burn.

Professor Perkins pointed out that this disease was common in all mallee districts in the early years of settlement. Years ago it was very bad on Yorke's Peninsula, but they seldom heard of it there now. Their present practices would gradually give way to other cultural methods, and this might lead to a lessening of the trouble. At the Roseworthy Agricultural College, where they were also on mallee land, they had had it to a limited extent. He felt confident it was one of those things they would outlive. Mr. Olston (Yallunda) stated that there was quite as much trouble on Yorke's Peninsula 30 years

ago with this disease as there was on Eyre Peninsula at present. He had not known takeall to be troublesome where the stumps had been pulled out of the ground. Mr. Newell (Koppio) suggested later sowing as a means of eliminating the disease. It was generally the early sown crops that were affected.

The afternoon session was closed with an address by the Superintendent of Experiments (Mr. W. J. Spafford).

Evening Session.

SHEEP ON THE FARM.

Mr. W. Wemyss contributed a paper on this subject. He referred to good fencing as the first essential for the farmer who kept sheep, and had found a 3ft. Sin. fence, the bottom wire $5\frac{1}{2}$ in. from the ground, second $5\frac{1}{2}$ in., third 6in., and the three subsequent wires each 7in. apart, suitable for both sheep and great stock.

A shortage of feed would detrimentally affect the wool clip, although no harm would follow making the animals work for their feed; hence their value for cleaning fallow. The Merino ewe crossed with the Lincoln ram had proved profitable in other parts where he had kept them, but it had yet to be proved whether this was the most profitable practice for this district. He did not doubt that the growing of feed for fattening the stock would prove a payable venture.

In discussing the paper, Mr. W. J. Cronin said keeping sheep on the farm entailed subdivision into small paddocks; fencing at present was expensive, and the question of the water supply was also to be considered.

Professor Perkins mentioned that for crossbred sheep it was necessary to have seven or eight wires in the fence, and the bottom wire should not be more than 2in, above the ground. If they were going to grow sheep to be sold as not less than 2-tooths, probably the halfbred Lincoln would meet the conditions but from the point of view of primeness at the lamb stage, this was rather a slow-growing sheep. It was necessary for them to have a certain amount of livestock on the farm, and sheep undoubtedly met the requirements in most cases. Small paddocks and water were necessary, but these conditions could be met in time. Mr. Vigar expressed the view that the farmer could not afford to be without sheep, and it would pay him to go to some expense and trouble to have the paddocks fenced. For this, netting could not be much improved upon. However, it was useless to keep sheep if they had to cart water for two or three months of the year. The best breed for general purposes was the South Australian With a more reliable market available, the Lincoln-Merino would prove an excellent cross. If it were found necessary to hold them over shearing, the Lincoln cross would be found to cut a better fleece than the cross with the Shropshire. Mr. Richardson (Koppio) had erected satisfactory subdivision fences with one wire at the top and another at the bottom of pig mesh netting. A barb on the top prevented the big stock knocking the fence about. This fence, said Mr. Newell, was about the only one that would enclose crossbred sheep. Other speakers referred to the good points of other crosses.

FREE PARLIAMENT.

Following an address by the Director of Agriculture (which will be published in a subsequent issue) a number of questions were dealt with by the visiting experts.

It was decided that the next Conference should be held at Yeelanna in March, 1917.

CONFERENCE OF SOUTH-EASTERN BRANCHES.

Kalangadoo was the venue of the 1916 Conference of South-Eastern Branches of the Agricultural Bureau, and the fixture, which was held on April 12th, was attended by the Minister of Agriculture (Hon. C. Goode, M.P.), the Dairy Expert (Mr. P. H. Suter), Wool Instructor (Mr. Henshaw Jackson), the Chairman (Mr. F. Coleman), and Acting Secretary (Mr. H. J. Finnis) of the Advisory Board of Agriculture, and, in addition, the following delegates:-Kalangadoo-J. Riddoch, Geo. Bennett, A. J. Haines, D. W. Tucker, S. Tucker, T. Bott, L. R. Davies, A. McKenzie, W. J. Hemmings, W. Gleeson, D. McCorquindale, jun., W. Rodgers; Mount Gambier-R. Fowler, A. A. Sassanowsky, C. T. Major, P. Pritchard, E. F. Crouch, J. Davidson; Naracoorte-S. H. Schinckel, E. S. Alcock. F. A. Holmes, R. A. Jenkins; Penola-H. Richardson, H. Ricketts. W. A. Clifford, S. Ockley, W. Miller; Kybybolite-E. S. Alcock, S. Shepherd, L. S. Davie, G. H. Hahn; Glencoe-J. T. Halliday, J. Dow; Millicent-J. J. Mullins, H. A. Day; Frances-L. Krohnetz.

THE EXHIBITS.

A feature of the Conference was the fine exhibits staged by members of the different Branches. All lines of Agricultural products in the South-East were represented by fine samples. The fruits shown bore eloquent testimony to the suitability of the district for the growth of horticultural products, and visitors and delegates were not slow to express their appreciation of the quality of the cereals, apples, pears, etc., root and forage crops staged.

MINISTER'S OPENING ADDRESS.

In response to the invitation of the Chairman (Mr. J. M. Mitchell), the Hon. C. Goode, M.P., addressed the gathering. The Minister mentioned that he had occupied the position of Hon. Secretary, and later, President of the Gladstone Branch of the Bureau, and hence, on his accession to the Ministerial office, he naturally took a great interest in the work and welfare of the Agricultural Bureau.

PROSPECTS OF THE SOUTH-EAST.

He proposed saying a few words in relation to the agricultural position in the South-East. It would interest them to know that Professor Gregory, an American who had lately visited the South-East, had expressed a very high opinion of the agricultural prospects of that part of the State.

It was generally recognised that much of the country in the district would have to be drained before it could be brought to its highest state of productivity, and anything in the nature of drainage on a large scale would have to be undertaken by the State. He was hoping that they would soon be able to go on with a much more vigorous policy in that connection, with a view to bringing the land under more intense culture than prevailed at present.

He had been struck with the enormous possibilities of the district in the matter of the production of fodder crops, and he felt that it was capable of producing stock in very much larger numbers than had been the case hitherto. The practice on the larger holdings was to run sheep, and he took it that in the winter the feed was somewhat short, and that was the time of difficulty. It should be possible, with the supplies of underground water that they had, to grow fodder in the summer and conserve it for winter feeding. That would materially assist them in increasing the carrying capacity of the holdings.

GOVERNMENT ASSISTANCE FOR SMALL HOLDERS.

There was little doubt that many of the small holders had difficulty in finding the capital to enable them to put in a suitable pumping plant, and he saw no reason why the State should not be able to supply them on easy terms of repayment. That would do much to enable the holder to carry on a small irrigation scheme on the farm, and go far to encourage greater interest in stock production.

The dairying industry was one in which the South-East was destined to play a very important part. There were thousands of acres which could be suitably utilised for dairying if they could go in for intense culture with irrigation.

The exhibits in the hall were an indication of what the district could do in the way of fruit production. However, the profitable growing of

fruit was somewhat limited by the market, but as the population increased, the demand would increase. Nevertheless, for several of the export lines there was an almost unlimited market, and there was no reason, after the termination of the war, why they should not continue the export of apples on a much larger scale than had been the case in the past.

THE BLUE LAKE AS A SOURCE OF IRRIGATION WATER.

Around Mount Gambier there was the opportunity of very much more intense culture than was being practised at present. The Blue Lake offered wonderful facilities for irrigating land in the immediate neighborhood. The only doubt in his mind was whether the lift was too great to enable them to pump profitably. This was a matter that would be investigated in the near future, and if it were practicable he did not doubt that it would not be many years before the Mount Gambier volcanic country would be under very much more intense culture. He felt sure that if the people who were interested would give the scheme their support the Government would back it financially.

He expressed the hope that when they met again in Conference the next year, they would be able to look back on the war as a thing of the past, and that they would bend their energies in the direction of increasing production. With increased activity in the agricultural and pastoral industries, they would find avenues for employment for returned soldiers.

He referred to the establishment of the Irrigation Training Farm for Soldiers, on the Murray River, at Pompoota. What was being done there, he said, would probably have to be done on a much larger scale, and the South-East would provide room for a number of these men. If it were necessary to purchase land in this district, he hoped that landholders would be prepared to meet the Government, and so make it possible to successfully settle these men.

He had pleasure in declaring the Conference open.

OIL AND PETROL ENGINES.

A paper on this subject was read by Mr. S. Shepherd, of the Kybybolite Branch. This was followed by an address by the Dairy Expert (Mr. P. H. Suter) on the feeding of dairy stock.

(To be continued.)

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^{*}No report received during the month of April. + Formal report only received.
‡ Held over until next month.



Dates of Meetings—
June 14th and July 12th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

AMYTON (Average annual rainfall, 11.82in.).

March 13th.—Present: five members.

Reference was made to the death of Mr. J. J. Cormack, who had been a very active member of the Branch.

Mr. A. Crisp read a paper on "Wheatgrowing," and discussion followed.

HOOKINA (Average annual rainfall, 12in.).

April 18th.—Present: 11 members and two visitors.

LAMB RAISING.—Mr. J. J. Henschke read a paper on this subject. For this district he preferred the pure-bred Merino, as they were not only hardy, but would produce a good fleece even if there were insufficient feed to fatten them. Young

produce a good fleece even if there were insufficient feed to fatten them. Young rams, free of excessive neek wrinkles, should be used, and changed every second year. The paddock for lambing down should be kept free of stock from the preceding winter, which would ensure an abundance of dry feed for an early lambing. April, during which month the weather was mild, was the best lambing time. Wethers and hoggets should be kept out of the mob of lambing ewes, as they were not only continuously on the move, but would at times flock round a young lamb and cause a nervous mother to leave it. Ewes that had lambed should be separated from those still carrying lambs. If the ewe refused to take her lamb, she should be tied or penned up, and held whilst the lamb had a drink every few hours. Shepherding and yarding ewes and lambs entailed more labor, but this was more than compensated for in the number of lambs reared. Tailing should be done when the lambs were a month or six weeks old. Frosty, or on the other hand, hot weather was to be avoided, and after the operation the wound should be dressed with Stockholm tar and kerosine and sheep dip. For a week after tailing the lambs should be kept out of old yards, in which there was a danger of their picking up tetanus germs. They should be weaned at five months. Mr. F. Stone agreed that the Merino was the most suitable sheep for the district, but he would not yard the sheep during lambing, unless foxes and dingoes were troublesome. The Chairman (Mr. D. Madigan) concurred in this view. Mr. B. Murphy preferred to be with the ewes, to render any necessary assistance.

MORCHARD (Average annual rainfall, 11in. to 12in.). March 21st.—Present: 13 members and one visitor.

SHEARING.—In a short paper on this subject, Mr. M. L. Brown said sheep should be dagged before they were brought to the shearing board, and sufficient to occupy a day should be penned on a grate overnight. The board should be swept after each sheep was shorn, thus preventing trimmings becoming mixed with the fleeces. Second cuts should be avoided. The fleece should be thrown carefully on to a table, with grating at the top sufficiently wide to allow the locks to pass through. Damp or stained pieces should be removed and dried in the sun. The baled wool should be firmly pressed, numbered from one upwards, with the description and grower's mark on the top of the flap and on the front. Mr. J. W. Richstein

thought it necessary for the farmer to thoroughly prepare his clip for market. Mr. W. A. Toop objected to a small clip being split into a number of classes. The bales should weigh about 300lbs., and not more than 335lbs. Messrs. Gregory, Toop, and Brown also spoke.

MOUNT REMARKABLE (Average annual rainfall, 23.04in.) March 8th.—Present: 18 members.

Mr. Turner explained the use of giant sunflower as a vermifuge for horses. The horse should be starved over night, drenched in the morning with 1 pint of milk, and five minutes after the drench the raw sunflower should be fed.

The President (Mr. G. Casley) gave an address describing his impressions of Yorke Peninsula farms, acquired on a recent journey to that locality.

ORROROO (Average annual rainfall, 13.42in.). March 18th.—Present: 10 members.

RECORD KEEPING.—In a paper on this subject, the Hon. Secretary (Mr. A. L. Brice) said that every farmer should keep careful records of all transactions and events connected with his occupation. Revenue and expenditure should be set out separately for each section of farm activity; this enabled the farmer to settle which branch of farming was most profitable. A record should be kept of the number of horses, cattle, sheep, &c., bred, bought, and sold by the farmer, with full particulars regarding each. A diary should also be kept, and this would prove a useful, and in after years a very interesting, record. If such methods were adopted by every farmer, the efficiency of their farms would be increased, as they would concentrate their attention on those lines of production which the records showed to be the most profitable. In discussing the paper, members agreed on the necessity for keeping a strict account of their undertakings.

WILMINGTON (Average annual rainfall, 18.26in.). March 15th.—Present: eleven members.

SEEDING.—In a paper on this subject, Mr. D. George said that, if dry, fallow land should be worked to a depth of from 1in. to 2in., and the wheat should be sown from 1in. to 1½in. deep. If the fallow were worked after rain, cultivation should be from 2in. to 3in. deep, and the seed sown at a depth of about 2in.; the soil should be harrowed after the drill. For early sowing in the district, Marshall's No. 3 and Yandilla King were to be recommended, sowing them at the rate of 1bush, per acre; for mid-season, Federation was to be preferred, seeding at the rate of 65lbs, per acre. Federation was not such a good stooling variety as either Marshall's No. 3 or Yandilla King. Riverina, Purple Straw, and King's Early varieties were, in his opinion, very suitable for late sowing; 70lbs. of these varieties should be sown to the acre. Of King's Early wheat 65lbs, should be seeded per acre. Superphosphate should be applied at the rate of ½ewt, per acre. In discussing the paper, Mr. J. F. A. Zimmermann said that deep working of fallow tended to cause caking and lumpiness of the soil. Mr. W. Schuppan stated that in the past season deeply sown seed was the first to suffer from the effects of the dry weather. Varied opinions were expressed by members in regard to manuring, but they agreed that the varieties of wheat mentioned by Mr. George were the most suitable for the district.

NARRIDY, March 13th.—Present: 12 members.—Mr. Haren initiated a discussion on smut in wheat. Various references were made to the occurrence of this fungus in crops during the past years.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BOOLEROO CENTRE (Average annual rainfall, 15.83in.). April 14th.—Present: eight members and one visitor.

PREPARATIONS FOR SEEDING.—In a paper dealing with this subject, Mr. Wibley said it was advisable to put the skim plough or cultivator over the land 13 months or 15 months ahead of seeding. If early rains fell, the weeds would be well advanced by the time the plough was put into the ground. The implement used

should cut not more than a 7in. furrow, the land being worked to a depth of from 2½in. to 4in., according to the nature of the soil. The harrows should cross the ploughing after the first, and, if possible, each subsequent rain, except in the case of clay soil, which was better left untouched. Then the cultivator should be used, working to a greater depth than was the case with the plough. Seeding should be delayed until after the second rain, if possible. Sixty pounds of good sound clean seed, with from 60lbs. to 80lbs. of super. per acre, should be sown. The grain should not be buried more than to its own depth in the soil. He pickled the seed in a solution of 1lb. of salt and 1lb. of bluestone in 10galls. of water, and had had no trouble with smut. A long discussion followed, members generally approving of the method outlined. The writer of the paper also gave details of the yields of 32 varieties of wheat which he had tested.

BUNDALEER SPRINGS.

April 12th.—Present: 11 members and four visitors.

Gardening.—In a paper on this subject, submitted by Mr. J. A. Gerke, the writer asserted that it was a mistake for the farmer to plant an extensive orchard, as the grain and fruit harvests came in almost together. When a garden was laid out, however, the best trees obtainable should be secured, and the land into which these were to be set should be thoroughly worked. No manure should be added, the roots should be spread and trimmed carefully, and the tree pruned to three branches. A soil with a limestone bottom should be selected where practicable. Pines were most suitable for shelter, gums and almonds being considered robbers of the soil. Several members, however, favored planting almonds around the orchard to provide shelter.

CRYSTAL BROOK (Average annual rainfall, 15.62in.). March 18th.—Present: 32 members.

PICKLING WHEAT .- In a paper on this topic, Mr. R. R. Shaw said that "bunt," or "stinking smut," was one of the worst enemies the wheatgrower had to contend against. Probably due to climatic conditions, it had been more than usually troublesome during last season. That would probably mean that unless more special precautions were taken in pickling wheat for the coming seeding, the crops would be affected as badly or worse than they were last season. It had been proved very conclusively that if seed wheat were properly pickled with bluestone solution before sowing, the loss from smut was reduced to a very small percentage. many different methods of pickling the seed; one of the oldest and most favored systems practised in this State was to pickle on the barn floor by sprinkling the bluestone solution over the grain, and then thoroughly shoveling it over backwards and forwards until every grain was damped with the solution; this system seemed to be fairly effective, if the solution were made the proper strength; but one great objection to it was that numbers of the smut balls might not be broken during the pickling process, but were broken in the drill, resulting in the reinfection of the The tank system should supersede the old style, as the smut balls floated on the surface, and could be skimmed off, thus preventing reinfection in the drill, also ensuring that every grain came into contact with the solution. Many farmers evinced great carelessness in the mixing of wheat-pickling solutions, and this was often the cause of unsatisfactory germination of seed. A useful strength solution could be made by mixing bluestone and water together in the proportion of alb. of the former to the kerosine-tinful of the latter, i.e., a 11 per cent. solution. The solution should not contain more than 11 per cent. of bluestone, or the germination would be seriously affected. Extra bluestone should not be added to the solution after it had been mixed and used, in the thought that it was weakening, because the strength of the solution did not vary. Mr. Shaw quoted from an official report on pickling experiments, which showed the value of different fungicides, effect on germination, &c. Considerable discussion followed the reading of the paper.

PORT GERMEIN (Average annual rainfall, 12.84in.).

March 28th.—Present: 11 members.

Mr. Blesing furnished the results of experimental plots which he had conducted to demonstrate the value of washing seed wheat before pickling. A discussion took place regarding the value of applying lime to the soil, and it was resolved to invite members of the Bureau, through the *Journal*, to give their experience with the use of lime.

REDHILL (Average annual rainfall, 16.79in.).

March 7th.—Present: five members.

WAR AND WHEAT.—A paper under this heading was contributed by Mr. F. A. Wheaton. The writer of the paper expressed the opinion that owing to the diversion of energy into other channels, and various other disadvantages arising from the war, wheat production in those countries actively engaged in the conflict would to a certain extent fail. Even in South Australia there was a tendency toward cropping smaller areas. The conclusion he drew from these facts was that the price of wheat would continue relatively high for some time to come.

WHYTE-YARCOWIE (Average annual rainfall, 13.91in.). March 25th.—Present: seven members.

Harvest Results.—Mr. E. J. Pearce reported that wild mustard was very prevalent among crops. Federation wheat had suffered considerably from flag smut. Mr. G. F. Jenkins also reported that weeds were very troublesome. Marshall's No. 3 had been the best wheat he had grown. Federation had also yielded well. Where the crop had been fed down in wet weather, it had blighted rather badly. Mr. J. E. Hunt said that Yandilla King had given the best return on his farm. Flag smut had been very prevalent in places. Mr. Walsh stated that Triumph had given the best return, with Bluey and John Brown next, whilst Federation yielded an exceptionally low average. Yandilla King yielded best with Mr. G. P. Mudge. Federation also yielded well. The Hon. Secretary (Mr. S. F. W. Robinson) stated that Federation was the best yielder on his farm, with Smart's Early and Yandilla King next, and Lott's the lowest yielder, owing to its being seriously affected by flag smut.

BEAUFORT, April 13th.—Members discussed the propects of the agricultural industry in South Australia, with special reference to the difficulties of the immediate future.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

NORTHFIELD (Average annual rainfall, 19in.).
March 7th.—Present: six members.

THE HOMESTEAD MEETING.—A paper was contributed by Mr. W. J. Dall, in which he referred to the value and benefits of the homestead meeting. He thought this feature should play a more important part in the activities of the Branch, and suggested that a competition should be held and a certificate of merit awarded to the holder of the best-kept farm. The paper was well received, and Messrs. D. Rowe, J. Williams, E. D. Kelly, and A. Sandercock took part in an interesting discussion.

SALISBURY (Average annual rainfall, 18.57in.). April 4th.—Present: eight members.

QUESTION BOX.—A number of questions were received and dealt with by members. Upward from 10 tons per acre was considered a fair dressing of sea shells. It was best applied by broadcasting, and then incorporated in the soil by cultivation. For cereals it was thought that the best depth of ploughing was from 5in. to 6in. Mr. Bagster advised varying the depth, in order to obviate the occurrence of hard pan. Baroota was the most favored wheat for sowing this season, King's Early being the second choice. It was generally thought that a 100-ton stack of wheaten hay could be kept for three years with but little wastage if the stack were kept well covered. Considering the absence of moisture in the subsoil, members advised harrowing the land immediately after rain, and cultivating about 10 days later. The Nonpareil was considered the most profitable almond for this district, Brandis being an uncertain bearer. Budding was preferable to grafting for working old trees, if young wood, suitable to bud, were available in the early summer. Mr. Moss thought it inadvisable to plant many of the Neuranjah Pratah orange, as it was a Mediterranean type, and an unreliable aropper. Members generally concurred in this opinion.

NANTAWARRA, March.—A discussion on "Pickling" was initiated by Mr. S. Sleep, and the different methods practised were commented upon by members.

NORTHFIELD, April 4th.—Mr. Dall (delegate) reported on the Conference of Lower Northern Branches, and an address on "Finance" was delivered by Mr. J. Eisele.

YORKE PENINSULA DISTRICT. (TO BUTE.)

MOONTA (Average annual rainfall, 15.22in.).
March 18th.—Present: 15 members.

BLACKSMITHING ON THE FARM.—In the course of a paper under this heading, Mr. A. B. Ferguson expressed the view that every farmer should make provision for blacksmithing on his holding. The practice of setting a forge out in the open was not one to be recommended, as the time to spend in the blacksmith's shop was when the weather would not permit of work in the open. The shop, which should be not less than 12ft. x 14ft., should not open toward the prevailing winds, as a cold wind blowing on to the fire made it difficult to get a welding heat. The forge should be set in the corner of the building, with the anvil about 6ft. distant. The necessary equipment, for which a locker should be provided, should include anvil, blower (or bellows), tongs, vice, drilling machine, stock and dies, top and botton swedges, chisels and punches, and a hacksaw. Messrs. Brinkworth, Stacey, Nankivell, Cadd, and Ortloff supported the views of the writer of the paper.

MOONTA (Average annual rainfall, 14.22). April 15th.—Present: 13 members.

ROTATION OF CROPS.—În a paper on this subject, Mr. W. T. Ortloff said the continuous growth of one crop on land year after year resulted in decreased yields; the same fact was noticeable with the natural herbage, i.e., in years following those in which there was a luxuriant growth of mustard, little of this plant would be seen in the fields. The idea had been suggested that crops excreted properties toxic to their kind. Therefore the practice of rotation of crops was advisable, and he suggested following wheat with oats, peas, or beans. For a number of years he had grown peas, and he found them useful for cattle, horse, sheep, pig, and poultry feed. For fattening lambs they were excellent. Rape and mustard might also be tried, but the rainfall requirement of these might interfere with their success. In discussing the paper, Mr. J. Atkinson favored the practice of following wheat with oats. Peas were excellent for sheep feed, and they had a very beneficial effect on the soil. Mr. W. B. Stacey favored the growth of peas, rape, and mustard, and Mr. J. Cooper endorsed the idea of growing oats. Messrs. W. J. Brinkworth and T. H. Hooper also spoke.

WESTERN DISTRICT.

COORABIE (Average annual rainfall, 11in. to 12in.). March 18th.—Present: six members and one visitor.

Conservation of Fodder.—In initiating a discussion on this subject, Mr. Riddle strongly recommended that farmers should cut more hay than had been their custom in the past, and adhere to the practice of keeping a spare stack of old hay on hand. He emphasized the value of storing cocky chaff—first in sheds, and then in the open with a straw covering. He had used chaff last year which had been stored in a brush shed for seven years, and came out in perfect condition. When covering a chaff heap in the paddock with straw, care should be taken not to allow the straw thatch to reach the ground, or the chaff would mould. A much better plan was to keep the straw thatch a little above the chaff, so that the air could circulate between the thatch and the chaff. It was a grave mistake to be hasty in burning

chaff heaps. Members generally endorsed Mr. Riddle's views. On the subject of ensilage the general impression was that only in exceptional years were the natural grasses sufficiently abundant in their district to warrant the erection of silos

ELBOW -HILL (Average annual rainfall, 11in. to 12in.).

April 15th.—Present: 12 members and one visitor.

MIXED FARMING.—Mr. P. G. Wheeler, who read a short paper on this subject, said no farm in the hundred of Hawker could be considered complete unless it carried sheep, cattle, and pigs. A farm of 1,000 acres on the flats should carry from 15 to 20 head of horses, 5 to 10 horned cattle, and, say, 200 sheep, with 300 acres cropped each year. It would be necessary to conserve cocky chaff from year to year. One big drawback in that part was the absence of a stock market, but an increase in the number of stock on the farms would be followed by improved marketing facilities. Members generally approved the remarks of the writer of the paper, but ruling prices of stock militated against purchasing at present. Mr. P. C. Wake referred to the success which had attended his efforts in growing peas, and recommended members to put in a few acres.

GOODE (Average annual rainfall, 12in. to 13in.).

February 16th.—Present: 17 members.

Space Time Improvements.—Whilst the majority of farmers in this part would feel inclined to affirm that there was no "spare time" on their farms, said Mr. E. T. Stephenson, in a paper under the above title, they could generally find a few odd days or half-days when there was nothing definite for them to do. He suggested that these should be devoted to the erection of gates between different paddocks, the grubbing of stumps on tracks leading to the entrance gates and the principal wheat paddocks. The provision of suitable roosting accommodation for fowls should also receive attention, and the erection of a platform well over the side of the tank, to prevent the destruction of the cement lining through the bumpping of the bucket. Attention to broken harness could also occupy a part of the time, as also could the erection of a breakwind around the house. The space inside this should be worked well, and planted with ornamental trees and shrubs. Mr. More time suggested recording in a note-book any items which required attention. Mr. J. Whitelaw advocated inspection and repairs to fences. Mr. W. Follard thought that as most of the farmer's spare time was in the evening, he should devote it to reading the Journal of Agriculture.

GOODE (Average annual rainfall, 12in, to 13in.). March 22nd.—Present: 13 members.

SEEDING PREPARATIONS.—The following paper was read by Mr. W. G. Morcombe:—"In considering the method to be adopted for working any particular piece of land preparatory to sowing, we must not forget that no hard-and-fast rule can be laid down, for even on one farm different classes of soil are met. Then, also, land which is fairly new, and therefore likely to be free from the seed of weeds, does not need the same careful preparation as older paddocks. Many excellent crops have been grown by simply didling in the seed on the stubble of second and third year land, and although I do not advocate this, yet I believe it to be preferable to ploughing such land deeply and burying a lot of stubble, which will tend to keep the land loose, and prevent the formation of a proper seed bed. The stubble should be burnt, if possible, by means of a fire rake, and then ploughing may commence without waiting for rain if the land be reasonably clean. It is quite sufficient to stir the soil to a depth of 2½in., as, in my opinion, deeper ploughing will prevent the formation of a good seed bed. If a farmer believes in deeper ploughing, I feel sure he will benefit by using the harrows, either in front of or behind the drill. This will help to sub-pack the soil. Land known to be dirty must not be ploughed dry unless the farmer is prepared to accept a poor crop, but if there is no alternative, as for instance, when the rain holds off for along time, I recommend sowing such paddocks with some quick-growing wheat, and then a week after the wheat has shown up, the harrows may be used to advantage to kill weeds which have sprouted.

This we experimented with on one dirty crop last year, and it proved an immense

gain, but the weeds must not be allowed time to root deeply, or the harrows will not kill them. A warm day is best for this operation, but damp weather, at any rate, should be avoided. It may happen that a farmer has much dirty land, and that it is necessary to plough at least portion dry. Should rain fall before seeding, it will be necessary to treat this land in some manner, and I advocate the stumpjump scarify harrows, where mallee roots and sticks have been sufficiently cleared to allow of their use. Otherwise disc harrows or some cultivator must be used; but it is important to go no deeper than is necessary to kill the weeds. In conclusion, I maintain that we must pay more attention to the packing of the soil 11in. to 2in, below the surface, and believe that wherever land has been fallowed, it is a mistake to plough that land again now deeper than stated, as the use of cultivators or harrows will have packed the lower layers of the soil previously ploughed, and much of the benefit derived from their use will be neutralised by loosening the soil to a greater depth.'' Mr. W. Tainsh expressed the opinion that harrowing after the drill would greatly improve the seed bed. Mr. V. J. Tonkin advised putting the roller over land to be used for haygrowing. Mr. W. Follard mentioned that if a farmer feared that the harrows would unduly thin the crop, he could sow 5lbs. or 6lbs. of additional seed per acre.

GREEN PATCH (Average annual rainfall, 26.56in.) March 20th.—Present: 12 members.

HARVEST RESULTS.—Members reported that the best results were obtained from oats sown on fallow land. Members who had sown kale in their oats secured excellent feed after the hay was cut.

WHEAT PICKLING.—In a paper on this topic, Mr. Venning said that bluestone had given most satisfaction as a pickling agent. It was necessary to exercise care in mixing the solution that, while it was strong enough to kill the smut spores, it was not strong enough to affect the germination of the seed. Frequently pickling of seed was left until the night before sowing, but this was a mistaken practice. The work should be done in time to allow the seed to dry thoroughly before it was put in the drill. There were various methods of pickling, and he recommended the use of a wooden trough, into which the wheat could be put, thoroughly swamped with the solution, and re-bagged.—Messrs. Sinclair Brothers tabled some very fine specimens of potatoes, weighing from 31bs. to 3½1bs. each.

KOPPIO (Average annual rainfall, 22.40in.). April 18th.—Present: 11 members and a number of visitors.

Notes on the Past Season.—A paper under this heading was contributed by Mr. W. R. Richardson, in the course of which he dealt with the many factors affecting the yields of cereals during the past season. After mentioning the distribution of the rainfall, and treating of other climatic factors, he gave the yields of different varieties of wheat on various farms in the locality. On one holding these were as follows:—Early wheat—Doris 21bush. per acre; mid-season—Federation 22bush., Dart's 21bush., Cooper's 17bush.; late—Yandilla King 17bush., West Australian Crossbred 13bush. In this case, the indication was that early and mid-season wheats did best; but from more extensive returns collected from other sources Marshall's No. 3 was the best yielder, with several mid-season wheats next. The averages from a number of holdings worked out as follows:—Early—Red Russian 9bush.; mid-season—Federation 13bush., Cooper's 15bush., Champion 12bush.; late—Marshall's No. 3 14½bush. On his own holding early varieties averaged 18bush., mid-season 18bush., and late just under 14bush. The most successful wheat, taking into consideration the area sown, was Federation. He contended that it was a wise plan to have portions of the crop ripening at different periods, the bulk, for preference, being ready in the mid-season. Members concurred in the views expressed.

MILTALIE (Average annual rainfall, 14.55in.). March 17th.—Present: 12 members and two visitors.

DETERMINATION OF SEX.—In a paper on this subject Mr. L. Aunger referred to the deductions which had been made by the students of evolution, heredity, and embryology, and dealt with the possibility of influencing the sex of beings.

STAR THISTLE.—Mr. W. G. Smith tabled a specimen of this weed, and expressed the hope that members would use every effort to prevent it securing a hold in the district.

DEEP V. SHALLOW PLOUGHING.—Members who had experimented in this direction during the past season gave their reports, which showed that wheat grown on shallow ploughed land yielded the better results.

MOUNT HOPE.

April 14th.—Present: nine members.

CLEARING SCRUB LAND.—In a short paper on this subject, Mr. R. Meyers advised rolling, say, in September, and allowing the rolled scrub to remain through the summer until March. By this time the shoots would be vigorous to a maximum. Before the fire was lighted, the springbacks should be cut. After the burn, which should be secured in the hottest weather possible, sticks should be picked and snags cut. Ploughing should follow immediately, and the cereal most likely to produce the largest straw yield should be put in. Before fireraking began, the stubble should be knocked down as much as possible, and for this purpose depasturing sheep on the land a fortnight before the fire rake was used was satisfactory. February was the most suitable time for fire raking; and the implement should be driven across the prevailing wind, with the stubble on the windward side. Mr. Colbert thought it necessary to run a log over the stubble before are raking it. Mr. A. Ness agreed.

SALT CREEK.

April 15th.—Present: 11 members and one visitor.

Fallowing.—Mr. F. W. Braunack, in a short paper, referred to the good results which followed the sowing of well-worked fallow. He suggested the use of a six-furrow plough, cutting to a depth of about 5in., between June and September, and harrowing the land after ploughing. The cultivator should be put over the land at least three times. The fewer stumps the farmer left in the ground, he said, the less would his expenses be for repairs to implements. Members generally agreed with the views contained in the paper.

YANINEE.

March 18th.—Present: 13 members and four visitors.

Fallowing.—Mr. F. Christian read a paper on this subject. He said that ploughing and cultivation of the soil admitted the air, which promoted the decomposition of organic matter. Fallowing operations also conserved the moisture in the soil and caused the destruction of weeds, converting them into fertilising material. To meet with success, fallowing should be done systematically, commencing immediately after seeding, and completing by the end of August. The harrows should be used to thoroughly pulverise the soil, and any weeds which appeared from time to time should be prevented from seeding by the use of the cultivator. Sheep were particularly useful in the subjection of weeds. Systematic fallowing would ensure that the land was ready for seeding when required, and this tended to the production of strong and healthy plants. In the dry districts special attention should be given to the treatment of the soil, as the adoption of proper methods of cultivation minimised the effects of lack of rainfall.

GREEN PATCH, April 17th.—In the absence of sufficient seeding rain, members thought it unwise to sow wheat, but oats could be dry sown with safety.

YEELANNA, March 25th.—Sheep on the Farm.—Mr. W. Wemyss read a paper on this subject, and it was well discussed by members, who expressed the opinion that sheep could be profitably kept by every farmer. The Merino was the best breed to keep on farms where the fences were not completed, and the wool, as a rule, brought the highest price in the market. Crossbreds were better sheep for mutton, but they were usually bad fencers.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES)

BOOKPURNONG EAST.

April 15th.—Present: 12 members and four visitors.

POULTRY.—A paper on this subject was read by Mr. S. Macklin. He thought that where foxes were at all prevalent, fowls should be yarded every night, in a yard not less than 6ft. high and partly roofed. He considered that the earlier fowls were fed after sunrise the better, and that, where possible, green feed should form a big proportion of their food. Where scale was prevalent, a little oil and kerosine on the legs was beneficial. Black Orpingtons were, in his opinion, the best fowls on a farm, as they were good layers and excellent table birds. Mr. Crase also emphasised the green feed item, and said that it should form at least 50 per cent. of their food. White Leghorns were, in his opinion, more profitable than Black Orpingtons, though the latter were a better all-round fowl. Mr. Mayfield spoke on the scale disease, and the paper was discussed by Messrs. E. H. Schulze, Adams, and Mr. Macklin then replied.

BOWHILL (Average annual rainfall, 12in.).

March 25th.—Present: nine members and two visitors.

The Chairman (Mr. G. A. Seidel) initiated a discussion on the quantities of seed and superphosphate per acre which should be sown in the district. Some members reported good results from applying heavy dressings of superphosphate with good stooling varieties of wheats, sown at the rate of 45lbs. to the acre. Other members feared that heavy dressings of superphosphate were likely to cause an excessively rank growth, which was very undesirable if hot winds were prevalent. Several opinions favored the application of 60lbs. to 70lbs. of superphosphate with 45lbs. of wheat of a good stooling variety; for the earlier varieties of wheat, as much as a bushel to the acre was to be recommended. Mr. T. Johns reported an excellent yield of grain from an oat crop—10 bags to the acre—which was reaped from land sown at the rate of 3 bags of seed to 17 acres.

COONALPYN (Average annual rainfall, 17.49in.)

March 17th.—Present: nine members and four visitors.

PREPARATION FOR SEEDING.—Mr. G. E. Venning gave an address on this topic. Thorough fallowing done as early as possible after the seeding time should be followed by picking up all roots and stone on the land, he said. Seed should be thoroughly cleaned and prepared at harvest time. Superphosphate should be secured in ample time before seeding. Ploughing should be commenced early, and the teams gradually worked up to their full capacity. Patches of land for green fodder should be sown early. On land over which there had been a good burn 30lbs. to 40lbs. of superphosphate should be sown; but on old land, such as paddocks for hay or early green feed, a dressing of up to lewt. per acre was advisable. If rain held off, and the land were ready, it would be safe to sow, provided that the seed bed was quite dry. Mr. Wall said that smutty seed wheat should not be sown, unless for the purpose of reproducing a quantity of some particular variety. Other members said that thoroughly pickling was a sure preventive of smut. Difference of opinion existed regarding the best method of pickling.

HALIDON.

March 15th.—Present: 12 members and three visitors.

FARM MANAGEMENT.—In a paper on this subject, Mr. W. D. Westover said that the homestead should be situated as nearly as possible to the centre of the farm. One great convenience of which this arrangement admitted was that the teams could be brought into the stable to feed in the middle of the day. When erecting subdivisional fences it was a wise plan to have races leading from the various paddocks to the water trough, so that stock in any of the grazing paddocks could have access to water at any time. A warm stable should be provided for the horses, and it could be built with a few pine uprights, to which a straw roof was affixed. Such a stable offered excellent protection in the winter, and was very cool in the summer. Harness, when not in use, should be hung in a dry place, and should be

given an application of neatsfoot oil and mutton fat twice a year. Special care should be taken with the collars, the lining of which should be kept clean and soft. Horses should be fed as regularly as possible, and it was wise to cut an abundance of hay for their requirement. For hay to be chaffed, Algerian oats were to be recommended, but for feeding long, wheats such as Gluyas, King's Early, or Baroota Wonder were preferable; hay should be a little greener for long feeding than for chaff. The farmer should save all cocky chaff, as mixed with a little pollard and oats, it was a useful feed in the early winter when feed was scarce. Sheep, pigs, and fowls should be kept on every farm. Sheep, apart from supplying meat for the household, were very valuable as a means of subduing weeds. Wheat screenings and heads could very profitably be fed to pigs and fowls. Only the best grain should be sown for seed; it was advisable to grade seed, and discard cracked and pinched grains. When farm machinery was finished with for the season, it should be thoroughly overhauled, and repaired if necessary. Fallowing should be very carefully done, and the land should be cleared of stumps ready for the drill. A few acres of land should be sown to barley or early wheat with the early rains, in order to provide early feed for stock. When too wet to work outside, employment could always be found under shelter in the direction of repairing and oiling harness, patching bags, &c. In the discussion which followed Mr. C. Russell mentioned that bookkeeping was an important part of good farm management. Members preferred the use of mallee posts to pine posts for use in the erection of buildings, on account of their greater strength. Pine posts were recommended for fencing, however, as more lasting than mallee.

HALIDON.

April 19th.—Present: 10 members and two visitors.

SEEDING OPERATIONS.—Mr. H. Bird, in a paper on this subject, emphasised the necessity for having the ground to be sown in good condition, in order that sowing should not be delayed. As much as possible should be put in during May. Care should be exercised in the selection of the seed, and this should be carefully pickled, for preference on the floor. When Gluyas was being grown, it was best to delay the seeding of this variety until the middle of May or June; it was then less likely to go down or be affected by the frosts. The land in the district, especially that of a sandy nature, was very suitable for oats, and he thought farmers should pay more attention to the cultivation of this crop for hay. Deep cultivation was not advisable. Share implements assisted in the destruction of roots, and hampered the growth of shoots, hence they were preferable to disc implements. In discussing the paper, Mr. C. Russell advised pickling the seed with a 1 per cent. solution of bluestone, poured over the grain on the floor. In discussing the area necessary to maintain a horse from July to September, Mr. Russell thought five acres sufficient, and for the full year 10 acres. Mr. J. Merry thought three acres would barely maintain one horse for 12 months.

LAMEROO (Average annual rainfall, 16.55in.). March 18th.—Present: 17 members and one visitor.

Harvest Results.—Members present reported on the results obtained in the past season. The wheats more generally grown were Gluyas, Marshall's No. 3, Yandilla King, Federation, Walker's Wonder, and Silver King. It was said that where seed was sown under dry conditions ''take-all'' was very prevalent, but seed sown in wet ground was not nearly so badly affected. The hay yield varied from 2 tons to ½ ton per acre, and the grain yield from 21bush. to 6bush. Members had cut a large quantity of hay, fearing another shortage might occur. Mr. T. Leckie sowed a piece of land 1½ chains by 1 chain with onions, and during their period of growth gave them three applications of bore water. In addition to onions used in his household, the area yielded 19cwt. 17lbs.

MANTUNG.

March.—Present: nine members and one visitor.

SEEDING OPERATIONS.—In a paper on this subject, Mr. F. Pontt recommended the selection of the best and largest grain for seed. He did not think it wise to sow the same variety of wheat for more than three years in the one field. If Gluyas and Carmichael's were mixed in equal proportions before sowing, it would be found that the latter tended to keep the former from going down. Yandilla

King and Federation varieties should be sown not later than April 15th. Early varieties were most profitable for this district, and 30lbs. to 37lbs. of good seed per acre would be found most suitable. A solution of 1½lbs: bluestone in from 12galls. to 18galls, of water was recommended as a pickle for the destruction of smut. It was a foolish practice, because the seed was badly affected, to increase the strength of the solution; all that was necessary was to ensure that the grain was thoroughly wetted. This operation should be performed two or three weeks before sowing, and the grain afterwards thoroughly dried. Members discussed the views expressed in the paper.

McNAMARA BORE.

March 5th.—Present: nine members.

Co-operation.—Mr. J. D. Aitkin read a paper urging the necessity for farmers co-operating for their mutual protection. It was their business to see that the cost of production was reduced to a minimum, and that their produce was sold to best advantage, he said. He suggested the formation of a farmers' selling agency, with its centre in Adelaide, and sub-agencies in the country. Messrs. Aitkin and Bicknell, in discussing the subject, referred to the success of co-operative concerns in Victoria. Mr. H. Sanders pointed out that the success of a co-operative venture depended largely on its paying a bonus on purchases in addition to dividends on shares.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).
April 15th.—Present: 17 members and three visitors.

Lamb Raising.—A short paper on this subject was contributed by Mr. A. Hartmann, who expressed a preference for the Lincoln-Merino crossbred ewe, mated with the Merino ram, for producing export lambs. The ewes referred to were heavy milkers, and as a rule the progeny was strong, and matured quickly. Early maturity was an essential. The sheep should be mated in October or early in November; the ewes would then lamb during warm weather, with less risk of loss than if they were dropped when it was cold and rainy. The best ewe lambs should be kept for breeding purposes. Some members who had tried the Shrop.-Merino cross found the wool too poor. Lincolns were more suitable for wet country. For small flocks some preferred the clean-faced Merino. One class of sheep only was to be preferred to having a pure and a crossbred flock on the farm.

NETHERTON.

March 25th.—Present: six members and one visitor.

FARM BLACKSMITHING.—In a paper on this subject, Mr. H. J. Gosden said that if farmers established blacksmiths' shops on their farms, implements and machinery could be kept in commission much longer. Minor breakages could be expeditiously repaired, and rapid deterioration of implements prevented. Hooks and eyeblots could be made, and shares sharpened after the farmer had had a little practice. When a breakage occurred, the farmer would understand the cause, and could probably effect some improvement which would prevent a recurrence. The requirements of a shop would consist of a blower or bellows, anvil (not less than 112lbs. in weight), vice, swedge block, punches, chisels, &c. A drilling machine, stock and dies, and a hacksaw were also important articles of a shop's equipment. A forge could be made from an old iron tank, and it should be so arranged as to admit the draught upwards. When heating iron, there should always be 3in. or 4in. of coal under it, the iron should be sufficiently heated before being wrought. Dies should not be used too loosely on iron, and they should never be worked on hot iron, otherwise their temper would be lost.—Mr. A. Bald submitted a table showing the rainfall recorded during the past four yars.

RENMARK (Average annal rainfall, 10.93in.).

DAIRYING.—Mr. W. H. Waters contributed a paper dealing with the question of dairying from the standpoint of the fruitgrower who kept from one to three cows, as a side line. He expressed a preference for the Jersey, which, he said, on a given quantity of feed would produce more butter than any other breed. The nervous animal was useless to the fruitgrower. "I like to see," the paper continued, "a nice yellow skin showing through the hair and good prominent milk veins. White

cows are very thin skinned, and often look very cold and miserable in the winter when others do not appear to feel the cold. Don't buy a cow that requires the bail and leg rope. In breaking in a young animal, tie her up to a post fairly short, and gradually lengthen the tie rope each day, until it can be dispensed with altogether. If a cow is on good feed, and very heavy in milk before calving, it is a good plan to milk her. This I have had to do even twice a day for a week before calving. Milking has a lot to do with making a good cow. A poor, careless milker would ruin the best of cows in a very short time. A good milker is one who has got his mind on the job, and who rapidly, yet smoothly, gets every drop the cow will give; a good milker will get a quart or even more from a good cow than a careless one. If a cow whilst in milk puts on flesh it is a sign that the cow is a duffer, or the milker one. Everything about milk should be clean; hence, before milking, wash and dry the cow's udder. This has a double advantage; it keeps the milk clean and removes dirt, which often causes cracks and sores on the teats. A simple cure for sore teats is fresh butter rubbed on. Calves should be taken from the mother at once, and should be given as much fresh milk as they will drink for a few days; then for a few weeks skim or separated milk with a little whole milk added. careful the calf gets the milk warm, and after the froth has been removed (if separated), otherwise it will be blown out from wind. During the cold weather it pays to keep the cows warm, so rug them at night. It is not a good plan to leave the rug on during the day, even if cold. Feed the cow well and she shows it in the milk bucket. Lucerne is a splendid fodder, either green or dried, but in the use of it one ought to be careful, as all cows are more or less likely to become blown through eating it. Lucerne also has the drawback of tainting the milk, although some cows are almost, if not quite, exempt from this. It is particularly dangerous during its young growth, but never in any stage of growth is it safe to turn a hungry cow out on lucerne. There are a number of cures for blown cows; first, and I consider it one of the best, a short length of wood (round) about as thick as a shovel handle, placed in the cow's mouth, and tied up to her horns. In a very short time this will effect a cure. Other cures more or less good are Stockholm tar on the nose, wet bags laid along the back, and, in extreme cases, the trocar or knife. Another first-class feed is paspalum dilitatum, a plant that will stand any amount Cows are very fond of it, there is no risk at any stage of growth, and it does not taint the milk. Other good summer fodders are sorghum and maize. For winter feed one cannot do better than barley. This must be sown early, say, at the end of February or the early part of March. Also, during the winter, I should at night give chaff and bran, or, better still, chaff and copra. I do not believe in feeding a cow at milking time. Give her the feed after you have milked."

ROSY PINE.

April 12th.—Present: eight members.

Consideration was given to the question of establishing experimental plots. Following the reading of a paper from the Journal, Mr. Lee expressed the opinion that it was unwise to plough deep in this district. He preferred the disc harrow to the spring-tooth cultivator. Mr. Bonnin thought dressings of up to 1cwt. of super. per acre would be found most profitable in this district.

STIRLING'S WELL

April 13th.—Present: 10 members and one visitor.

SEEDING OPERATIONS.—Mr. A. G. Kurbank, in a short paper on this subject, said oats could be sown immediately, preferably on land which exhibited signs of 'takeall' in the preceding crop, and also on stubble intended for grazing. New ground and fallow should be sown directly a good rain fell. Following this, stubble should be skim ploughed to a depth of $2\frac{1}{2}$ in. to 3in., and sown immediately, the harrows preceding and then following the drill. Heavy soils should be dressed with 50lbs. of super. for new land, 60lbs. on stubble, and 80lbs. on fallow, good sandy or light loamy soils receiving a little extra. The heavier or stony soils should be seeded with hearly varieties, and sandy and light loamy land with mid-season varieties. Late wrieties should be avoided. Thirty pounds of clean, well-pickled seed should be used per acre. The majority of members favored a 50lb. per acre dressing of high-grade manure.

WOODLEIGH.

March 20th.—Present: eight members and three visitors.

Mr. E. T. Smith initiated a discussion on the question of sowing shrivelled grain, and finally Mr. E. Good undertook to conduct experiments with graded wheat. Arrangements were made for members to conduct experimental plots as follows:—Mr. F. G. Petch—Advantages of harrowing growing crops; Mr. H. A. Good—Methods of cultivation; and Mr. E. T. Smith (Hon. Secretary)—Manurial tests.

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UNIFORM WIDTH OF WAGONS.—At the February meeting, Mr. P. Maloney read a paper, in which he said that owing to the sandy nature of the roads in new districts it would be a distinct advantage if a uniform gauge for wagons were adopted, as the draught of the vehicles would be considerably lightened if the wheels always followed the same tracks. He suggested a width of 5ft. 2in.

BOOKPURNONG EAST, February 12th.—One Acre on the Farm.—Mr. S. Hannan contributed a short paper with this title, in which he dealt with the possibilities of profit arising from the planting of an acre of land with fruit trees, vegetables, and green feed. Messrs. Mayfield, Crase, Adams, and H. O. Schulze took part in the discussion which followed.

BOWHILL, March 25th.—Members generally were of the opinion that 60lbs. to 70lbs. of super., with about 45lbs. of good stooling wheat, or up to 1bush. of early wheats, were the best for this district. Mr. Johns reported having reaped 70 bags of oats from an area of 7 acres, which had been thinly sown.

CLAYPAN BORE, March 20.—Mr. J. Grey initiated a discussion, in which he referred to the benefits resulting from thorough cultivation. Members generally agreed that if the standard of cultivation were raised the yields of the district could be increased.

GERANIUM, March 18th.—In discussing the last harvest, Mr. Hughes mentioned that early wheats had proved best. Mr. Norton thought Yandilla King the wheat best suited to the district. He preferred early sowing. A general discussion on seeding operations followed.

MONARTO SOUTH, March 18th.—Bureau Work.—Mr. B. E. Schenscher read a paper on this subject, in which he testified to the value of the Bureau, and urged producers to display more interest in it. Experimental work should also be undertaken by the members of the Branch.

WILKAWATT, April 20th.—A good discussion took place on the pickling of wheat. Messrs. Neville Brothers mentioned the success which had attended the use of formalin, which they had adopted for some years. It was decided to make a practice of tabling samples of garden produce every three months, with the object of creating interest in farm gardens.

WYNARKA, March 18th.—Mr. Colton read a paper dealing with the unit value of manures. A discussion was initiated as to the most suitable crop for early green feed, and opinions were divided between an early wheat (e.g., Gluyas) and Cape barley, but in a cold, wet winter the former was considered more satisfactory. It was not considered advisable to harrow, owing to the tendency of the soil to drift.

WYNARKA, April 15th.—Arrangements were made for seeding and manurial tests to be conducted by Messrs. J. R. Beth, C. W. Schultz, A. Hood, W. H. Richardson, E. G. Colton, G. G. Pitt, and F. E. Greig during the coming season.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.). February 21st.—Present: seven members.

THE RUTHERGLEN FLY BUG PEST (Nysius vinitor).—The Hon. Secretary (Mr. C. G. Savage) contributed the following paper:—"This so-called fly is a native of Australia, and though present every year, does not generally do much damage to fruit crops. Dry spring and early summer months appear to favor a rapid increase of the bug, consequently the pest has done great damage in many parts of Australia this season. The fly is about in long, being of a light greyish brown color, turning to nearly black at a later stage of its life; the wings are trans-



parent, and legs dirty yellowish white. The rostrum or beak is carried under the body when the bug is not feeding, and it is with this instrument that the damage is done to the fruit. The fly does not confine its energies to any particular class of plants, but attacks many kinds, being found in grass plots, wheat and potato fields, and gardens. The life history is somewhat obscure; the eggs presumably are laid in the soil, the larvæ are hatched, and from them emerge the flies. The insects breed rapidly, especially in grassy plots, hence the reason the fruit of a dirty orchard suffers more from the attacks of the bugs than that in a clean garden. The insects attack the ripening fruits by hundreds, their rostrums are thrust through the skin, and the sap of the fruit is sucked out, and in many cases all that is left is the skin and stone, and the fruit is useless. In the vegetable garden the bug does most damage, in the potato and tomato plots often destroying the whole of the crops. Fruit that is picked before the pest has sucked all the juices from it is often rendered unsightly, and consequently unsaleable, by the depositing of excreta upon the fruit by the fly. The best preventive for this insect is clean cultivation, as this destroys its breeding places. Smoke fires are sometimes used as a means of driving off the bugs, but this only relieves the orchard for a while, and at the best we only drive the flies on to our neighbor's fruit. One grower at Wentworth kills the fly by wiring old rags or bagging to the size of small balls upon a handle; this is dipped in kerosine and lighted, then waved through the trees; the insects are killed by thousands. Care must be taken not to scorch the trees. Another grower suggests the using of tar in place of kerosine; the advantage claimed is that a thick dense smoke is given off, which kills the insects, and all danger of damaging the tree by the flame is removed, as the torch is merely held under and not passed through the trees. In Victoria benzole soap is used with great success; but this compound being unobtainable here, Mr. Quinn has advocated the following spray wash:—Benzine, 2 pints; water, 2 pints; soap, ½lb. It is made by boiling the water and soap together, then removing it from the fire and adding the benzine, care being taken to remove the mixture far enough away from the fire to prevent the benzine vapor becoming ignited. The mixture is then emulsified by pumping several times from one bucket to another. This stock solution will make 5galls. of All the insects which the spray touches are killed almost instanspray wash. taneously; others fall to the ground and can be treated there. The great advantage of this spray is that, as fruit has usually to be sprayed for this pest when nearing the ripening period, and this wash is volatile, no trace of either taste or smell of the emulsion can be detected on the fruit two or three days after being applied."

CHERRY GARDENS (Average annual rainfall, 35.03in.). April 18th.—Present: seven members and six visitors.

The meeting was held at the homestead of Mr. C. Ricks. A general inspection was made of the holding. Particular interest was displayed in an eight-year-old orchard of Cleopatra apples, in a somewhat low-lying position. The marked absence of bitter pit in the fruit was attributed by Mr. Ricks to the light pruning to which the trees were subjected; light pruning, he thought, tended to discourage the development of the disease. He had found sheep in the orchard a very effective means of retarding the development of the collin moth, by consuming windfall apples, &c.—On Saturday, April 22nd, members tendered a farewell to Messrs. H. and C. Jacobs, who were leaving on active service.

CYGNET RIVER.

March 14th.—Present: 11 members and six visitors.

ORCHARD PLANTING.—Mr. J. J. Osterstock contributed a paper on this subject. He said that land intended for an orchard should be well cleared and deeply ploughed as long as possible before the trees were planted. If the orchard was not to be wholly planted in the first year, the southern and western portions should be planted first, and on the extreme boundaries a belt of breakwind trees should be provided, such as a double row of upright almonds, or three rows of damson trees, or some hardy variety of plum. Pegs should be driven in the ground to mark the positions of the trees, which should be 18ft. apart. Holes should be made sufficiently large to comfortably accommodate the roots of the trees, and the ground around the hole should be loosened to a somewhat greater depth than the ploughed land. The roots of trees should be examined when planting, and damaged por-

tions cut off. It was better to cut off a root than to allow it to circle around the hole. In heavy and hard ground explosives should be employed to lighten the work of digging holes, and also to loosen the earth and aid the roots in their penetration of the soil. Trees should be planted early in the season, and the land ploughed and harrowed during the winter, following with cultivation at intervals until the last fall of rain in order to conserve all possible moisture. Trees would require to be watered during the first summer at least, and the application of manure would be of considerable benefit. Mr. H. T. Noske said that, as a result of his experience, he had concluded that almond trees were unsuitable for breakwinds on Kangaroo Island. Trees should not be planted closer together than 25ft. in order to allow of the use of the horse cultivator between when they reachel maturity. June was the best month in which to plant. Mr. R. Loader also advocated a greater distance than 18ft. between the trees. He thought the carob tree would prove a better breakwind than the almond tree on Kangaroo Island.

KANMANTOO (Average annual rainfall, 17.90in.). March 18th.—Present: 11 members and one visitor.

PREPARATION FOR SEEDING .- In a paper on this topic, Mr. H. G. Pym emphasised the advantage of having seeding preparations completed in time for the first good downpour of rain. Whether fallow land or otherwise, it should be cleared as well as possible of stones and stumps; this not only facilitated the seeding operations, but lessened the possibility of a breakage with the drill, which entailed loss of time in effecting repairs. Seed wheat should have been reserved from harvest, and should be true to type, and as clean and free from foreign matter as possible. Preferably, the seed should be graded, a practice which was not so widespread as it should be. Seed should be pickled a sufficient time before seeding to enable it to become quite dry before being sown. Ploughs, drills, cultivators, &c., should be overhauled, and the necessary supply of extra parts should be secured. Superphosphate should be on hand in sufficient quantity to complete the seeding, and if barn accommodation were available, a good supply of chaff should be cut, so that attention could be concentrated on seeding operations when conditions were favor-An important matter was the care of harness, more particularly the collars; in many cases these were allowed to become worn and hard, so that the jar on the horse's shoulder was not relieved, with sore shoulders as a consequence. In conclusion, it would be useless to take a great deal of trouble with other preparations if the farmer did not have his working horses in good condition, as the pressure of work at seed time would make heavy demands upon them.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

March 21st.—Present: seven members and one visitor.

Handfeeding Sheep.—Mr. H. J. Wiadrowski contributed a paper on this subject. Having in mind the present prices of fodder, wool, and meat, he said they would do well to consider the question of handfeeding stock, especially breeding ewes, during the latter part of the summer and autumn. This would result in a higher percentage of stronger lambs, which would mature more quickly. Oats and feeding barley would show a good profit if turned into wool. At the outset it would, of course, be necessary to give systematic attention to the practice, in order to ascertain the most profitable ration. The growth of mangolds for summer and autumn feed also was deserving of attention. Members differed in opinion as to the wisdom of handfeeding.

MEADOWS (Average annual rainfall, 35.52in.). March 14th.—Present: six members and one visitor.

SEED POTATOES.—In dealing with the necessity for careful selection of seed potatoes, the Hon. Secretary (Mr. F. Nottage) expressed the opinion that it did not, as a rule, pay to grow from the same seed more than twice. The plan he adopted was to procure a few bags of imported seed in the spring, and plant them in late December in well-prepared ground. Tubers produced in this way had yielded three tons per acre more than locally grown seed. He preferred large cut seed. In discussing the subject, Mr. Pearson thought it unnecessary to change seed so frequently. He contended that it should be carefully picked over when digging operations were in progress, and those tubers of a good even sample, and well shaped, should be selected.

MOUNT BARKER (Average annual rainfall, 30.93in.).

March 15th.—Present: 32 members.

Farmers' Weeds.—The Hon. Secretary (Mr. J. E. Smith) read a paper on this subject. Mr. B. Stephenson mentioned that poppies were very prevalent, having apparently been introduced with the seed wheat sown in the preceding season. He advised members to root them out before they had time to seed. For the destruction of dodder in lucerne, Mr. Coppin recommended burning furze brushes over the infected patches. Weeds on garden paths, &c., should be watered with a solution composed of 1lb. of arsenic and 2lbs. of washing soda, with 25galls. of water. The soda should be dissolved in 3galls. of boiling water, and the arsenic added little by little, the solution being stirred meanwhile, the balance of the water then being added. A solution of 1lb. of coarse salt in 2galls. of boiling water was also useful for destroying weeds.

NARRUNG (Average annual rainfall, 17in. to 18in.). March 11th.—Present: nine members and two visitors.

MANURES .- Mr. G. G. Hackett read a paper on this subject. He said that the practice of manuring was a very old one, it having been the custom for centuries to apply animal excreta to cultivated soils. Farmyard manure was very valuable for increasing the humus content in soils. It was necessary to use it with care when applying it fresh to the soil, but in storing it, unless preventive measures were taken much of its value was lost. By placing layers of pipeclay alternately with the layers of manure, however, the loss of ammonia could be avoided. Ammonia was a valuable fertiliser in some soils. He had observed last season rich dark-green patches of crop in the fields, which were the result of urine deposited by the horses, when a fall of rain aided its absorption into the soil. The science of chemistry had evolved different kinds of fertilisers which met all requirements. Superphosphate remedied deficiencies of phosphoric acid, and the excellent results obtained by its application in many places indicated that phosphoric acid was not present in the soil in sufficient quantity. Lime was valuable as an amendment, but as it caused superphosphate to revert to a comparatively insoluble condition, it should not be applied to the soil with superphosphate. The application of basic slag Nitrate of soda should not was an alternative to the use of superphosphate and lime. be mixed with superphosphate-[Nitrate of soda is generally applied in the spring.-ED.]—nor should basic slag be mixed with farmyard manure. In the sandy soils of their district, the great need was to increase the humus and promote bacterial activity. Possibly the application of lewt. of rich black soil with ½ewt. of superphosphate, would assist in this. Gypsum, also, should be a useful application to The application of fertilisers did not have a temporary effect only, sandy land. but acted in the direction of the continual improvement of the soil. for the application of fertilisers concerned every farmer, and justified a study of the question by those interested.

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

April 3rd.—Present: eight members and one visitor.

LETTUCE GROWING.—Mr. E. Hart, in a paper on this subject, said that if good lettuce were to be produced, a reliable seed should be sown, and the best means of obtaining this was for the grower to produce the seed himself. A good type should be selected from the early beds, and these allowed to run up to seed. Cheese cloth tied over the plants would protect the seed from pests. Plants should be raised in a box similar in size and shape to a galvanized-iron case, with small-meshed netting over the top. In this should be placed stable manure, fowl manure, and earth, the seed being sown in this fairly thinly. The seedlings should be, for preference, ready for planting in late August and September. Later, the seed could be sown in drills, and the plants afterwards thinned. They should be 10in. or 12in. apart each way. Manurial dressings should consist of stable manure and bonedust, fowl or pig manure if available. Sulphate of ammonia or blood manure should be added when the plants were half-grown. Regular watering, preferably by means of the sprinkler, was essential. New York was the best variety; and small but regular plantings were advised. Mr. S. Hawke thought it difficult to raise lettuce seed in the Hills on account of the bird pests. Mr. Cobbledick preferred early seed grown in the Hills. Mr. Benell agreed, and recommended flooding in place of sprinkling. Iceberg and New York varieties were best.

CLARENDON, February 14th.—Mr. C. H. Beaumont (Inspector of Orchards) delivered an address on the evaporation of fruit, and illustrated his remarks with blackboard drawings.

LONGWOOD, March 18th.—The meeting was held at the homestead of Mr. H. Winter, and an inspection of the orchard and garden was made by the members. Afterwards opportunity was taken to bid farewell to Mr. Furniss, who had been a member of the Branch for nearly 10 years.

SOUTH-EAST DISTRICT

GLENCOE (Average annual rainfall, 33.84in.). February 14th.

FARMING PEAT LAND .- Mr. J. T. Carthew contributed a paper on this subject. He dealt, historically, with the cultivation of chicory on this class of soil, and mentioned that whilst at first very heavy yields were secured, these decreased, until a method of broadcasting super. on top of grass land, and then ploughing it in to a depth of 9in. or 10in., was adopted. The practice at present in vogue for washing this crop was to place eight or nine bags of the chicory in a wooden trough, and scrub it with a stiff yard broom. Potato production was a profitable venture on peat land, and the growth of rye for feed during the winter months was practised. Rape and kale for spring and summer feed also did well. However, with all crops it was necessary to dress the land with superphosphate. In reply to questions, the writer said chicory was sown in drills 8in. apart, and his practice was to use one bag of super, per acre. A 3ft. strip of rye was sown every half-chain to prevent the peat drifting with the wind. A man could dig two tons of chicory per day. It was very good as cattle food, but there was only a limited market, and he did not think it could be profitably grown at Glencoe. A general discussion followed. Members considered that whilst liming the land would be productive of better growth, the present cost of lime and the absence of spreading machinery rendered its use unprofitable. Varying opinions were expressed as to the value of superphosphate. Mr. J. T. Halliday favored bonedust as a fertilizer. Mr. J. Riddoch thought the constant use of super tended to encourage the growth of sorrel, the best means of getting rid of which, the Secretary (Mr. G. F. Ferguson) said, was summer ploughing.

MOUNT GAMBIER (Average annual rainfall, 32in.).
April 8th.—Present: 20 members.

A number of exhibits were tabled and discussed by members.

GRASSES FOR THE DISTRICT.—In a paper on this subject the Hon. Secretary (Mr. D. H. Collins) said:—"All will agree that where lucerne can be successfully grown it easily takes precedence in providing an abundance of green fodder; but to obtain the best results it must be irrigated, and cut and carted out to stock. Where only a cow or two is kept this may pay, but where there are fairly large paddocks I doubt very much if it will. Lucerne will not stand grazing too closely, especially with sheep, as they eat the crown out in summer, and it soon disappears. A grass that will stand grazing, shoot with the first rain in autumn, grow well all the winter, stand frost, and be at its prime in August, before any of the other grasses have any strength in them, last for a number of years when once established, easily grown, and suited to the heavier land around Mount Gambier, is ryegrass. nutritious, possessing all those valuable properties that go to produce prime beef and mutton, as well as keeping up a steady flow of milk all the year round, and also makes an excellent horse paddock. It should be sown with the first autumn rains. I have tried spring sowing, but if the season turns dry, and we have a long dry spell, the young plants may die before they become established. The method of sowing we adopt is as follows:-Plough the land to a fair depth, say, 4in., harrow, and then roll, and sow a bushel (not less) of the best ryegrass seed obtainable, broadcast, to the acre, and then lightly harrow. It is advisable to drill in, before rolling, about a bushel of Cape barley or oats, to shelter the young plants, and to stop any drift. To make an ideal pasture paddock I would advise sowing a little

white clover, say, 6lbs. or 7lbs., with one bushel of ryegrass per acre. This makes a beautiful paddock, and if cut for hay makes excellent fodder for cows. Schanck clover or birdseye clover, mixed with ryegrass, also makes excellent hay. I can, without doubt, say that where it is intended to graze paddocks for a number of years it pays to go to some little expense in sowing ryegrass. If the paddock could not be spared to lie out under grass for at least five years, the next best thing I could recommend is to sow Italian ryegrass, which is a biennial, or, still better, Westernolths ryegrass. In conclusion, I recommend perennial ryegrass for our heavier soils (not sand), where the paddocks are intended to be grazed for a number of years; on our sandy soil cocksfoot, which stands a lot of feeding and holds well, and for the lighter soil paspalum, which is a soft, succulent grass, and stands a lot of nibbling. For the light, stringybark and ferny country I recommend sowing spear grass, an abundance of which there is always obtainable at our local mills." In discussing the paper, Mr. Wedd said that on light sandy soils ryegrass had been a failure, whereas on heavy soils it had lasted for years. Mr. A. A. Kilsby found that the harder the soil and the nearer the clay it was grown the better this grass did. Mr. A. A. Sassanowsky said it was one of the best crops they could grow where they had stiff soil that was left under grass for four or five years. The President (Mr. R. P. Priktow) referred to the practice of sowing lucerne in drills 15in. apart, and remarked that he intended to adopt that in future. On flats that are not inundated, paspalum did very well; planted in the spring, it grew well on the swampy flats.

NARACOORTE (Average annual rainfall, 22.60in.).

March 11th.—Present: 27 members.

EXHIBITS.—A fine display of farm produce was tabled by Messrs. W. Loller (who showed apples, pears, and grapes, and sweet corn), W. G. Haynes (grapes and Teff grass), T. Barclay, A. Hutchison (tomatoes), A. J. Johnson and S. H. Schinekel (potatoes, onions, and tomatoes).

FARM COMPETITION.—The Hon. Secretary (Mr. W. H. Smith) reported on the progress made with the arrangements for the farm competition to be held under the auspices of the Branch. Prize-money to the extent of £30 had been collected.

RABBIT DESTRUCTION.—Further discussion took place on this subject, and a resolution was carried in favor of the destruction of rabbits by any practicable means.

LUCINDALE, March 25th.—The Hon. Secretary (Mr. W. M. Secker) submitted the results of experimental work carried out on his farm. Mr. T. Ferguson tabled some fine Emperor Alexander apples, also some annual saltbush, about 4½ft. high. He had irrigated a very small patch, and fed it as green feed before it seeded, as it was then very soft and tender. Mr. Secker tabled eight varieties of apples and a Vicar of Winkfield pear.

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Conference of Agricultural Bureaux.

The Conference of Upper Northern Branches of the Agricultural Bureau will be held at Orroroo on Friday, July 14th. Sessions will be held in the afternoon at 2 o'clock and in the evening at 7.30. Lectures by officers of the Department of Agriculture, papers by Bureau members, and a "free parliament" will occupy the attention of the Conference.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh, dourine (or equine syphilis), equine fever, epizootic lymphangitis, tarcy, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis, All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock. Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c. diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

"R. M.," Kulpara, reports a horse chronically stiff, with swellings under belly, which do not yield to treatment; condition good, but water blood red.

Reply—The conditions all point to chronic disease of the liver, and complete cure is not likely; but it might be worth while to give once daily in the food for a month a teaspoonful of saltpetre, a tablespoon of sulphur, and a teaspoonful of salammoniac; and report progress at end of time.

"W. S.," Verran, West Coast, reports troubles as follows:—(a) Cow calved May 2nd, and passes blood and jelly; humps up when milked, and urinates painfully; losing flesh. (b) Pony with warts on head and neck. (c) Pony blind, with white thing in middle of eye, with black spot of old standing.

Reply—(a) Probably did not clean properly; drench her with 1lb. Epsom salts with 1oz. ginger in a quart of warm beer; flush her out behind with a gallon or two of solution of Condy's crystals in warm water, as much as will lie on a sixpence to 2galls.; afterwards give her 10 drops tr. pulsatilla on tongue twice a day for 10 days. (b) If warts are big enough to get a piece of silk or horse-hair round them, tie tightly and allow to drop off; for smaller ones put a ring of lard around them to prevent dressing hurting skin, mix powder sheep dip with lard to stiff paste, and put on wart every few days till it drops out. (c) Pony has a cataract, and there is no cure.

"W. S.," Verran, West Coast, has a draught horse with hard lump about size of hen egg on neck, slightly to right of throat, where pipe collar goes; not sore.

Reply—This is a fibrous tumor, and as it does not irritate it will be well to leave it alone; but if desired, a horsehair snare can be put round it and the stretched skin cut, so that the lump can be squeezed out and its roots severed; the wound would then be treated with spirit of iodine.

"J. K.," Campoona, has a light bay mare, 7 years, with irregular appetite and chronic abdominal disturbance.

Reply—The mare suffers from chronic indigestion, partly induced by last year's feed; she would probably improve by having a tablespoon of the following powder twice daily in feed:—\{\frac{1}{2}\}lb. each sulphur, nux vomica, tartrate of antimony, gentian, ginger, sulphate of magnesia, and 1lb. each of brown sugar and linseed meal. It is a good plan twice a year to give either Epsom salts or sulphur, preferably the latter, the dose of which is an ounce (a tablespoon, roughly) once a day in feed for a week or ten days. The dose of Epsom salts varies as to the purpose it is given for, a couple of ounces daily act as alterative, 4ozs. for a few days as laxative. See bulletin 85 "The Medicine Shelf."

"A. C. B.," Coomandook, reports stallion, rising 5 years, want of tone. Reply—It would be well to give as much grey powder as will lie on a shilling, once a day for a week (mercury and chalk), just placing it on the tongue, or

he could be given bran only for two days, and then a six dram physic ball. Rations have frequently been given in the Journal of Agriculture suitable for such Try the following daily: -25lbs. chaff, 4lbs. bran, 10lbs. oats, 1lb. oil cake or boiled linseed, 10lbs. hay at night.

"F. N.," Meadows, asks if a pure-bred boar is put to a crossbred sow, then to a pure-bred sow, will the latter sow be likely to throw crossbred pigs?

Reply-There is no scientific reason why she should. The theory of telegony, which generally applies to animals throwing back to some previous sire, is based upon very insufficient evidence, and may be disregarded; the apparent cases where it seems to hold good may generally be explained by some more accurate

"E. G. J.," Port Adelaide, has a pony mare, 4 years, fair condition, lampas, poor appetite, lies down after feeding, was brought up on sand, looks round at flanks, tires very easily, dung and water normal, but rumbling bowels.

Reply-Lampas is not a disease, and burning the bars as described is a criminal offence. The condition is due to teething, which also accounts partially for the dainty feeding; but the main trouble is damage to the lining of the bowels by the sand, though, after the dosing, there is not much there now. Improvement will follow feeding of sloppy mashes for a day or two, and green feed, such as lucerne, if available. Procure ±0z. grey powder (mercury and chalk) and give as much as will lie on a sixpence twice a day for a week, then give 10 drops tr. nux vomica twice a day for another week. Each medicine may be just placed on the tongue as it is, or mixed with a little treacle or honey and smeared on the back teeth.

"L. M. A.," Tharkuna, Victor Harbor, has a mare with recurrent attacks of

stoppage of the water.

Reply—There is probably organic mischief in the bowels, and possibly wrong methods of feeding and watering. It would be well to put her on bran mashes only for three days, and then resort to ordinary feed again. Try 10 drops of tr. nux vomica on the tongue morning and evening for a fortnight. will be given during attacks by mixing 25 drops essence of peppermint with 25 drops household ammonia and sufficient treacle to enable it to be smeared on the teeth each half-hour, if necessary, till better. Brisk rubbing of the flanks and belly is needed, and possibly enemas.

"G. A. H.," Tintinara, has a barrow pig, four months, which goes round in

circles, and has not much control of limbs.

Reply-The trouble arises from worms, and he should be better for the treatment given, Epsom salts and sulphur. It would be well to feed charcoal in trough regularly. The circling is due to worm cysts in the brain. If native quinine is available, feed a handful of the plant daily; if not, give as much santonine as will lie on the small point of a penknife once a day for a week, if value of pig warrants expense. Early fattening and slaughter would be the most economical treatment.

"A. M. R.," Norseman, Western Australia, reports that light stallion, rising 5 years, drawing quarter ton load in spring dray, steep sandy pitch, next day became stiff, sleepy, off feed. Third day brought same load seven miles, kept stopping, and wanted much urging; dung passed with difficulty, no appetite, sleepy, and lying down or standing with one hind leg stretched out backwards.

tender on both flanks; no chance of sand; colic after drinking.

Reply-These well-observed symptoms have helped very materially in coming to a diagnosis, as they well describe what happens when a stallion becomes runtured, in this case probably high up in the inguinal ring, and hope of complete recovery is small; but benefit will follow the administration on the tongue, morning and evening for a fortnight, of 15 drops tr. nux vomica and, should the pain be violent, 25 drops of essence peppermint and 25 drops household ammonia, with enough molasses to smear in the mouth each half-hour till relieved. If pain becomes uncontrollable, then an ounce of chloral hydrate dissolved in a pint of warm water as a drench. Probably surgical relief will be necessary if the bowel becomes strangulated.

"M. G.," Lipson, has a horse puffed like a sheep's bladder on each side the hock.

Reply—The condition is a severe thoropin, which means distension of the oilbags through which the large tendons run. For farm work it is not likely to be much detriment, but may enlarge. Treatment, except by a qualified veterinary surgeon, is not of much use, but a sharp blistering with the biniodide of mercury blister so often prescribed in these columns may reduce the swelling somewhat.

"E. H. S.," Pungonda, has a mare, 6 years, due to foal in September, has a full udder of milk.

Reply—"This occurrence generally points to the slipping of a foal, but sometimes it refers to an untimely one of twins, the other being carried to full term; therefore, she will have to be watched to decide. Treatment will consist of 10 drops of pulsatilla on the tongue morning and evening for a week. The udder needs no local treatment. Steady light work is advisable.

"G. Bros.," Yeelanna, have a draught gelding, 9 years, losing condition fast on good feed, slobbers very badly, and legs swell in mornings; teeth apparently all right, coat rough, but bowels and kidneys acting properly and appetite good.

Reply—The symptoms of thread worms in the stomach and blood worms in the circulation. Try two tablespoons of Fowler's solution of arsenic (obtainable at chemist's, Lincoln) once daily in the food for a fortnight, then a teaspoon of baking soda twice a day in food for a fortnight; then repeat the arsenic for a fortnight, then the soda, and report progress in a few weeks.

"J. H. W.," Lowalde, has a bay gelding, rising 4 years, which has broken out in lumps all over, especially on sheath; they smell badly; colt is miserable and

Reply—Most probably bastard strangles. Give on tongue, morning and evening, 10 drops arsenicum for 10 days or so, and every second day give in drinking water or feed once loz. (a tablespoonful) of hyposulphite of soda (photographers' hypo.).

"A. P. F.," Naracoorte, has a draught gelding, 8 years, in good health, which suddenly became very stiff, and recovered during the night.

Reply—Probably there are too many oats in the chaff, and the horse had a slight attack of haemoglobinuria, which means that nitrogenous poisons are thrown back on the circulation on account of inability to digest them. The best line of treatment is a laxative, such as a pint of raw linseed oil with a tablespoonful of turpentine in it, or 20cs. of photographer's hypo. in the drinking water. It is well for some days after to give plenty of bran.

"W. W. R.," Crystal Brook, reports that sheep go stupid, shake all over, seem

to have a headache, and refuse food; symptoms worse when excited.

Reply—The symptoms of a parasitic infection, due to sarcosporidia; the disease is known as scrapie in the Old Country, and is very common in South Australia. Nux vomica, 10-drop doses, has been well reported on, but the only practical remedy for a large flock is to constantly change their paddocks, as the infection is picked up off foul ground. As these are being artificially fed, it would be well to mix a pound of Cooper's sheep dip with 15lbs. salt, and allowance an ounce of the mixture to each eight sheep once a day for several days, taking care that it is thoroughly distributed throughout the feed, so that each animal gets approximately the dose intended for it. If only a few are affected, it would be well to dose them with the same firm's tablets, two to each sheep once a day for a few days.

"E. T. S.," Loxton, has a bay gelding, 6 years, which rolls in team (shunts); sore shoulders.

Reply—Rub well down after work, and then apply a lotion made of tincture arnica 1 oz. and methylated spirit 1 pint. Before work apply to sore and collar a little dressing made of 2ozs. white lead and a pint of neatsfoot oil, repeat in midday. Probably a thin strip of zinc on collar where rubbing occurs will minimise the difficulty.

"C. E. M.," Parilla, has a draught bay mare, 11 years, with lump outside off knee as big as one's fist.

Reply-If the lump is hard it is probably a spiropteric cyst, and must be removed surgically; if it can be compressed it is a synovial enlargement, and the treatment will be rest for some months, and a daily rubbing in of a little oleate of mercury, 20 per cent.

"S. F.," reports a black gelding, 5 years, losing condition, hidebound, indiges-

Reply-It would be well to put him on bran for two days, and then give a fivedram physic ball; after this has ceased to work 10 drops tincture nux vomica on tongue morning and evening for a week will do good. If wolf's teeth exist they will do no harm.

"E. R.," Minlaton, has a mare, 9 years, with eyelid swollen from fly irritation. Reply-There is every likelihood of a small cancer growth setting up, which will have to be removed by the knife. In the meantime anæsthetise the parts with a cocaine solution, and lightly touch with lunar caustic. This treatment will have to be repeated about every three weeks, and may result in destruction of the irritation. Care must be taken not to touch the eyeball with the caustic.

"H. A. B.," Monarto South, has a mare, seven years; cut tendon below hock

which has healed, but has left swelling which increases with work.

Reply-Ordinary work would probably be beneficial to the leg, but it is probable that the swelling will be permanent. If treatment is desired it might be the daily rubbing in of a very little cleate of mercury, 20 per cent., or daily application of Stockholm tar.

"A. J. L.," Langhorne's Creek, has a pony with eyelids red and swollen, and

blue scum over eye.

Reply—Probably periodic ophthalmia. Hang a cloth from the forehead band over the eye, and keep it moist with a lotion made of tincture arnica loz., methylated spirit half a pint, and water a pint.

"J. P.," Clarendon, asks for the symptoms of dry bible in cows. Reply—The early symptoms are those of indigestion, therefore bloating may be one, then follows the harshness of coat, the tenderness of the feet and fetlocks, then irregular appetite and bowel action, and finally, loss of appetite and paralysis.

In addition to the replies printed above, veterinary advice has been forwarded to 'F. C. T.,'' Stokes; 'E. G. C.,'' Kulde: 'W. J. M.,'' Mindanie; 'H. H. V.,'' Mount Hope; 'A. W. M.,'' Lameroo; 'W. R. H.,'' Frances; 'J. F. H.,'' Leighton; 'E. E. B.,'' Tumby Bay; Leighton Agricultural Bureau; 'G. P.,'' Petersburg; 'W. J. A.,'' Stansbury; 'C. L. B.,'' Karoonda: 'A. E. T.,'' Mallala; 'C. E. A.,'' Ungarra; 'W. J. P.,'' Aldinga; 'W. R.,'' Balaklava; 'F. C. H.,'' Clare; 'A. W. E.,'' Saddleworth; Mundoora Agricultural Bureau; 'C. H. C.,'' Wirrabara; 'W. G.,'' Appila-Yarowie; 'G. H.,'' Naturi; 'P. Bros.,'' Mundalla; 'Bon Ami,'' Hynam; 'H. W. T.,'' Maitland; Brentwood Agricultural Bureau; Port Broughton Agricultural Bureau; 'W. J. A.,'' Stansbury; 'H. R. F.,'' Borrika; ''R. H. H.,'' Strathalbyn; 'L. H. J. R.,'' Halidon; 'L. & Son,'' Moonta; 'H. H.,'' Angaston; 'J. D. A.,'' Karoonda; ''E. O. D.,'' Koonibba; Wepowie Agricultural Bureau; ''A. J. R. C.,'' Cleve. In addition to the replies printed above, veterinary advice has been forwarded to

THE FARM FLOCK.

[An address delivered by the Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S.) before the Conference of Lower Northern Branches of the Agricultural Bureau.]

The successful management of a farm flock depends upon the knowledge and judgment displayed in the initial selection of breed and type and in the skill shown in the subsequent handling of the animals concerned. The choice of foundation stock will be determined by the system of sheepfarming which it has been decided to adopt, and in arriving at a decision in this matter the farmer, in the main, will be guided by economic considerations. Broadly speaking, the systems of sheepfarming may be divided into two groups. Firstly, those which provide for the keeping of sheep for short periods of the year when feed is abundant; and, secondly, those that involve the establishment of a permanent flock of breeding ewes.

In certain districts, by reason of the innutritious character of the herbage and prevalence of liver fluke, stomach worms, and other parasites, the breeding and rearing of lambs is a perilous undertaking, and sheepfarmers so circumstanced are often compelled to adopt the practice of keeping "flying stock." This term implies the keeping of a flock for limited periods, and may be used in reference to the purchase of ewes or wethers off shears, to be sold again when fat, or else, in the case of the ewes, to be tupped and sold again either in lamb or with lambs at foot. It is to this interrupted system, in one or other of its variations, that settlers in the recently opened areas will resort in the first instance, and it is perhaps as well that those unacquainted with sheep management should gain some preliminary experience in this way before launching out on the business of breeding export lambs.

Even in the older settled areas there are farmers who are content to purchase from year to year, or borrow from their neighbors, a sufficient number of sheep to keep the fallows clean, rather than undertake the responsibilities attaching to the management of a permanent flock of ewes. It is true that sheep require more skill than other classes of stock, but the difficulties are by no means insurmountable, and the ratio of the profits to the labor expended is such that almost every farmer in the country should be induced to engage in the sheepbreeding industry. Generally speaking, however, the

"flying flock" system is not applicable to our conditions, and relatively few farmers possess the special powers of judgment and discrimination that are essential to success in the domain of the sheep-dealer. We have, therefore, to consider the question of the selection of a suitable breeding ewe as a basis for the farm flock.

Farm breeding flocks may be kept for one or other of the following purposes:—(1) The production of fat lambs; (2) the breeding and rearing of breeding ewes and rams; (3) the production of wool. Relatively few farm breeding flocks are kept mainly for the purpose of wool production. In some of the poorer districts, however, where the annual losses at lambing and among the hoggets is high, the surplus over and above the flock requirements is small, and great difficulty is experienced in fattening lambs for market. The chief source of profit under these circumstances is the wool clip, and when the flock is being culled the fleece is counted more important than the frame and carcass development. In this district, however, the first consideration of the sheepfarmer will generally be the early fat lamb, and, within reasonable limits, all other qualifications will be subordinated to those that make for success in this direction.

VALUE OF BREEDS.

During recent years a good deal of work has been done in South Australia and in New South Wales with regard to the merits of different breeds in relation to the production of export lambs under Australian conditions. It is generally conceded that the Merino ewe is admirably adapted to our climate, that when home bred she is well suited to farm conditions, being easy to fence, hardy, and healthy, and that the quality of its flesh is good. Moreover, the Merino is a breed that can be obtained in almost any quantity desired at all seasons of the year. It cuts a more valuable fleece, under normal conditions, than other sheep, and crosses well with rams of English breeds.

Nevertheless, there are many reasons why the Merino lamb is unsuitable for export. In the first place, the Merino lacks the quality of early maturity, and does not develop a neat, shapely lamb. Being long in the leg, narrow over the back, and deficient in the hindquarters, it can never throw a satisfactory lamb for the oversea trade. Moreover, the Merino ewe is an indifferent mother, with a poor milk supply, and she does not fatten off readily when her breeding period is over. It is obvious, therefore, that to obtain the best results, we must call in some other breed or breeds to rectify these defects if we are to make use of the Merino ewe. It has been stated as a possibility that for "freezers" it might be found profitable to

confine attention to English breeds, such as the Shropshire for dry districts, and the English or Border Leicester for the Hills and South-East, or even to adopt a definite system of breeding half-bred lambs without reference to the Merino. In New Zealand, for instance, the Down rams are sometimes mated with Lincoln and Leicester ewes, but the practice has never become widespread, and for obvious reasons it is inapplicable to our conditions. Even if English breeds were obtainable in adequate numbers, it would be found more profitable as a general rule to adopt a system of cross-breeding, using the Merino ewe as a basis.

QUESTION OF CROSSES.

The first cross between the Merino ewe and the English breeds seems likely to predominate in South Australia over other and more desirable types for some time, owing to the difficulty experienced here in obtaining an even line of half-bred or cross-bred ewes. is important, therefore, to contrast the merits of the various halfbred lambs within our reach. The cross that is found most profitable in the North will not be the best for the cooler districts. Generally speaking, it may be said that the long wool half-breds will find favor in the South, and the Down cross in the North. long wool breeds-Lincoln, English Leicester, Border Leicester, and Ronney Marsh-are adapted to districts that carry grass in the fields nearly all the year round. They do not thrive as pure breds under dry conditions unless crops are grown especially for them. The Lincoln, which is the largest of them all, carries the heaviest fleece, and this quality is transmitted to the half-bred, which accounts for the widespread popularity of the Lincoln-Merino cross. ever, the Lincoln is very slow to mature, and its flesh and fat are inferior in quality. The rams, however, being large in the head and coarse in the bone, are on the whole less suitable for breeding fat lambs than either the English or Border Leicester. The English Leicester, to which the Canterbury lamb owes its reputation, has the squarest and most shapely carcass of the long-woolled breeds, and it stands first amongst them in its capacity to lay on fat. Border Leicester matures rather more quickly, and lays on more fat internally, but it stands high on the leg, and the frame is deficient in depth, and in consequence it carries its mutton high up on the rib. In wool production, quality of flesh and fat, hardiness and prolificness, there is little to choose between them, but the neater and more compact appearance of the English Leicester carcass-which is less weighty and more nearly approaches the "freezer" type—the shape and neatness of the head, and marked prepotent powers due to Bakewell's system of breeding, render it specially well adapted for lamb breeding in our humid districts.

The Romney Marsh carries a large, heavy head, is rather high over the withers, and often deficient behind the shoulder. It does not handle so well as the foregoing breeds, but the meat is, if anything, superior in quality to that of the English Leicester. The carcass, however, is less attractive in appearance, and the lamb does not reach maturity as early. The breed is suited to wet conditions, and is capable of grazing sour pastures to better advantage than any other breed.

I do not wish it to be understood, however, from what has been said, that the English Leicester-Merino or any other long-wool half-bred is superior to the Down half-breds from the point of view of the lamb market. The flesh of all the long-woolled breeds is coarse and inferior, and the fat is more or less tallowy in character; but nevertheless, the long-woolled cross, and, in my opinion, preferably the English Leicester cross, would prove the more profitable in cold climates, for the reason that the lambs that have to be carried over and shorn give a much more valuable clip than Down half-breds, and the ewe lambs will command a higher price if disposed of as breeding stock.

REQUIREMENTS OF THE NORTH.

In the North we are concerned with Merino x Down lambs, as it is specially important to aim at early maturity, and even if they were otherwise suitable, the long wools would not fulfil our requirements in this respect. Of the Down breeds, there are available to us Dorset Horns, South Downs, and Shropshires. Relatively to longwoolled breeds, they are much more compact and more evenly covered with flesh; the fat is distributed more uniformly through the meat, which is of the highest quality. The most widely used of the Down breeds in our State is the Shropshire, but it has not given universal satisfaction, and while it is no doubt a fact that this has been due at times to the use of inferior rams, this cannot be accepted as a complete explanation of the case. In many respects the Shropshire meets the demands of the lambbreeder. handy-sized sheep, prolific and hardy; the head is not so coarse as to cause undue losses at lambing time, and the carcass is fairly The dark nose and points are also in its favor as a sire of export lambs. The hindquarters are well filled, and the ribs well sprung; still they do not handle so well as the Dorset Horns or Southdowns, nor are the dressed carcasses so attractive as those of the Southdown cross. It is generally contended that they mature a little earlier than the Southdowns, but this has not been our experience at Roseworthy. In 1906 and 1907 the Director of Agriculture conducted tests at the College to ascertain the rate of increase in first cross lambs by Dorset Horn, Southdown, and Shropshire rams with the following results:—

Average Daily Rate of Increase.

	1906.	1907.	Average. 1906/1907.
Lambs.	Ozs.	Ozs.	Ozs.
Merino by Dorset Horn	8.16	8.20	8.18
Merino by Southdown	7.04	7.17	7.10
Merino by Shropshire	5.76	7.10	6.43

It is admitted that mere weight is not in itself a measure of early maturity, but when it is seen that the rate of increase is greater in the case of the smaller framed lamb, the figures cannot fail to arrest Under different climatic conditions, it is possible that the Shropshire lambs would develop even more quickly than the Southdown, but in our district, at any rate, the balance of evidence is not in their favor. Quite apart from the question of weight, the Southdown lambs proved to be prime earlier than the Shropshire half-breds, and there can be no gainsaying the fact that the Southdown lamb is a perfect model of symmetry. The breed is noted for its meat-producing qualities, the flesh being fine grained, tender, and juicy, and the fat evenly distributed. The head is neat, and the body, being very close to the ground, appears smaller than it really is, and consequently they kill out much better than they look. lambs are hardy, and do well even when closely folded. Like all the short-woolled breeds, they carry a light fleece, but the percentage of culls amongst Southdown half-breds is so small that this is a matter of relatively small importance. The Dorset Horn lamb out of Merino ewes is unsurpassed for early development, and had it been equal in other respects to either the Southdown or Shropshire, would have forced them both into obscurity. The Dorset half-bred is seen at its best in the lamb stage, but the flesh is distinctly inferior to that of the other two types of Down lambs, being coarser and not so well flavored. Another feature of the breed that has militated against its success in the export lamb trade is the white face and white shanks, preference being shown in the home markets for lambs with dark points.

Nevertheless, the Dorset Horn x Merino lamb is a very profitable sheep to breed, for although the carcass will be worth less per pound, it will scale heavier than either Southdown or Shropshire bred lambs under similar conditions. If quality were the chief consideration,

Southdown rams would be indicated; but from a business standpoint, I am not at all sure that Dorset-Merino lambs, which fatten at the rate of over ½lb. per week more than their competitors, would not be an equally good proposition. Against the Dorset cross, however, must be set the lessened value of the ewe's fleece, brought about by the extra tax on her system.

As already stated, it is only force of circumstances that make it necessary to market half-bred instead of cross-bred lambs in this For reasons already cited, the Merino ewe is undesirable as the mother of fat lambs. Half-bred or cross-bred ewes are always hardier, more vigorous, and better milkers, and quicker to fatten when culled. They can carry big-bodied, early maturing lambs without injury to their fleece, and it is for these reasons that the Merino has been replaced by Crossbred ewes on the farms in New Zealand. The establishment of a half-bred or cross-bred flock brings into consideration the wool producing qualities of the breeds. In the cooler districts, a dual purpose type of ewe is to be commended, whereas in some of the drier districts, where only Down half-breds can be kept, the value of the fleece is of secondary importance.

For the same reasons that I favor the Leicester half-bred lamb, I incline to the Leceister half-bred ewe. At the same time, I am well aware that the Lincoln x Merino is the only half-bred available in our State to any extent, and even they are difficult to obtain. Where possible to do so, I would advise using long-woolled halfbred ewe hoggets as the foundation of the lamb-breeding flock. is quite conceivable that the Lincoln-Merino ewe will be found too big and heavy, and too coarse in the bone to thrive in our light land districts; but I believe there are few localities in which the smaller, finer-bodied, and lighter-fleeced Leicester cross would not do well comparatively with the Down crosses. In dry districts, where long-woolled half-breds are unsuitable, the Dorset Horn-Merino ewe would be the most serviceable type to breed, as she is a good doer under hard conditions, nurses her lambs well, and imparts to her progeny some of the early-maturing qualities of her The chief difficulty with them in good years is to keep them down in condition, so that their breeding qualities may not be lowered.

THE RAMS.

Having discussed the ewe flock, we have now to consider the choice of a ram to sire the export lambs. In 1912 the Sheep and Wool Expert in New South Wales sent home a consignment of 221

lambs from Lincoln-Merino ewes by rams of five different breeds, with the following results:—

	On slaugh				Value of	
			London.	Pence	Lambs	
	Avg. weig	tht. Av	g. weight.	per lb.	per head.	
	lbs. ozs	lbs.	ozs.	_d.	s. d.	
South Down x Lincoln-Merino	29 14	28	4	4.08	$12 \ 3$	
Dorset Horn x Lincoln-Merino			0	3.80	$12 \ 10\frac{1}{2}$	
Hampshire Down x Lincoln-Merino	31 1	29	8	3.76	11 11	
Border Leicester x Lincoln-Merino	31 6	30	0 (3.74	12 0	
Shropshire x Lincoln-Merino	30 8	28	3 14	3.72	11 9	

The London salesman, in commenting on the carcasses, remarked that, "generally speaking, and from a selling point of view for this market, the Southdowns are the best; the Dorsets have a good frame, and would be good carcasses, but they are lacking in finish. The Southdowns are certainly the best shape and of the best quality. The Border Leicesters, Hampshires, and Shropshires are decidedly inferior to the other two breeds, being of the well-known Merino type, long in the legs, and decidedly lacking in fat. Perhaps the Shropshires are not quite so inferior on general points as the Border Leicesters and Hampshires." The remarkable feature of these results is the relatively low value assigned to the Shropshire carcasses. and I cannot help thinking that the lambs in question were slaughtered rather early. It is also noteworthy that whilst the Southdowns were worth more than 1d. per lb. more than the Dorsets, yet when the extra weight of carcass is taken into account, the gross value per head amounts to 71d. in favor of the Dorset Horn. districts, the Downs will always give better results than the longwool rams, as the latter throw coarser lambs, with less aptitude to Moreover, there is difficulty in getting their lambs prime fatten. before they are over weight. The Dorset Horn lambs are not ideal, being less shapely and more inclined to coarseness than the Southdown or Shropshire: but for the Australian market I do not think they could be improved upon. For export lambs, however, I would prefer the Southdown, and next to it the Shropshire, provided rams of good breeding are obtainable.

GENERAL MANAGEMENT OF FLOCK.

Having now traversed the story of what may be termed the "battle of the breeds," we pass on to consider one or two points in connection with the general management of the flock. The first point that the breeder of cross-bred sheep will have to attend to is the condition of the farm fences. To make a thoroughly satisfactory fence the post should carry eight wires, and these should be kept well strained up, especially those near the bottom. The lowest wire should not be more than 2in. off the ground level. This in-

volves a certain outlay, but it is an expense that must be faced by everyone who intends breeding cross-bred lambs for export. The introduction of cross-breds on to a poorly fenced farm means endless worry while the crops are growing, and will more than likely lead to trouble with neighboring landholders.

It is important also to restrict the number of ewes, so that all the lambs can be kept going without check from the day they are dropped till they are in the saleyard. Checked lambs are always the cull lambs, and unless a farmer in this district is fortunate in having a crop of kale or forage available, he will find it a most difficult matter to top up reject lambs before the ensuing autumn. It does happen occasionally that farmers make more on their culls than they do on their early lambs, but this does not affect the position, and should not influence the breeder any more than a phenomenal crop on autumn-ploughed land would influence a farmer against early and well-worked fallows.

The first operation in the sheep year is the culling of the flock immediately prior to shearing. In a lamb-breeding flock this is a All ewes with broken or weak mouths, relatively simple matter. defective udders or teats, should be cast, and ewes known to be shy breeders, even though, in consequence of their sterility, they present a particularly attractive appearance, should be relentlessly discarded. For lambbreeding a four-course rotation is better than a five: but when a good even line of ewes has been secured, there is a very strong temptation to hold on to them another year; and if their mouths were sound. I believe I would prefer to do so. The reason for advocating a shorter rotation under ordinary circumstances is that the broken-mouthed ewe is unable to do her lamb well enough. and ultimately she fetches less money in the fat market. drafting out the ewes, the hoggets are gone over carefully to see that they are all sound before being admitted to the breeding flock. It is at this time that the advantage of breeding ewe hoggets on the farm is felt, as they are more even in type and more contented than newly purchased additions. The system, however, involves a reduction of the lamb-producing capacity of the farm by 25 per cent., so that in small holdings, or even on fairly large estates in districts where the right class of sheep is readily procurable as hoggets, the ewe flock would properly consist entirely of breeding Some breeders adhere to the policy of buying up draft station eyes, which they dispose of again after a lamb has been They claim that the older ewe is a more retaken from them. liable breeder, and that parturition is attended with a lower per-Their system, however, does not make for unicentage of deaths.

formity of type and evenness of quality, two factors which are of the first importance in the fat lamb trade. For the local market it may do well enough if sufficient care be shown in the selection of the ewes; but for export lambs it is better to buy young ewes of a suitable class, and to stick as closely to the type as possible when drafting out or adding to the flock.

In order to obtain the best percentage of lambs, the ewes should be mated on good feed, and the number of ewes to the ram should be under rather than over 50. It is foolish to economise in rams when breeding fat lambs. The presence of several rams in the one field means a higher percentage of lambs, and it is a good plan to hold back one or two and introduce them to the flock a fortnight or three weeks later. One or two vigorous ram hoggets are sometimes saved to catch up any missed ewes after the other rams have been withdrawn. By keeping a careful watch to see whether the rams are working, and by adopting certain stimulative measures, such as close-varding over night, or the temporary withdrawal of the rams. it should be possible to raise the lambing percentage on small holdings to over 90, and where English rams are used on half-bred ewes the lambing should approximate to 100 per cent. At lambing time the farmer in the North will have his attention divided between seeding and the care of the ewe flock. Lambing ewes require to be visited at least twice a day, and oftener if possible, particularly when there are many hoggets in the flock, and when large-headed rams have been used. Ewes that require assistance should receive careful handling and good nursing. With a little experience, cases of difficult birth are not usually hard to remedy; but unless the ewe be tenderly dealt with in the process, there is grave risk of her succumbing to the treatment. The use of carbolised oil as a lubricant and a little brandy or sweet spirits of nitre as a stimulant when necessary will prove helpful, and by raising up the hindquarters of the ewe so that the expulsive force of the uterine contractions is to some extent nullified, the task of the shepherd is simplified. In all instances in which prostration occurs—and this is usually so when a dead lamb has to be removed piecemeal—the ewe should be placed on a bed of clean straw in a sheltered corner of the field, or better still, under the lee of a straw stack, and given regular attention. Until recent years sheep have not been sufficiently valuable to induce farmers to adopt such careful practices as I have advocated; but I believe the day is fast approaching when farmers will realise the necessity of bestowing upon their breeding ewes the same watchful care and treatment which they vouchsafe to their broad mares and springing heifers. Lambing ewes should be undisturbed, except for the shepherd's visits, and they soon become accustomed to his presence. No dog should be allowed near the field, and as far as possible strangers should be prevented from intruding. At every opportunity ewes that have lost lambs should have motherless lambs worked on to them, and it is important to see that the whole of the lambs are properly mothered night and morning. When a lambed ewe is not available, the motherless lamb should be handreared in a sheltered yard. It is only by imitating these practices, which experience has shown to be profitable in other parts, that we can hope to obtain a really high lambing percentage.

Ewes should be lambed on green pastures, so that their udders may be kept well supplied. Whilst rearing their lambs the feed cannot be too forcing. Early sown rape and mustard, kale, stubble pastures, rank cereal crops, or lucerne paddocks will serve to hasten the lambs along during the winter and early spring, and the later lambings can be finished on pease, kale, or lucerne. For export lambs should dress from 30lbs. to 37lbs., the lighter carcasses being graded as first class, while those going 40lbs. or over fetch a lower price per lb. The ideal freezer is a prime lamb scaling 35lbs. to 36lbs. The London market affords no encouragement to the export of lean lambs. They must be well covered on the back and ribs, tightly packed in the legs, and the whole carcass should be plump and well rounded.

One of the greatest troubles that besets the fat lambbreeder in this district is an obscure disease that affects ewes shortly before lambing. The animals attacked are always in good condition, and commonly, though not invariably, carry twin lambs. The first indications of disease are dullness, impaired appetite, and a disposition to separate from the remainder of the flock. They stand in a halfdazed condition, and permit anyone to go right up to them without attempting to move. If forced to move, they do so very slowly and aimlessly. Later on they pass into a state of semi-consciousness, lose the sight of both eyes, and remain on their feet, grinding their teeth and occasionally staggering along a few paces, till they ultimately fall and die. The disease runs its course in about a week, and although not always attended by fatal consequences, the prognosis is always unfavorable. Another feature of the disease is that the wool separates from the skin in the early stages. plaint was investigated some years ago by the New Zealand Department of Veterinary Science, and it was found on post-mortem examination that the liver was much enlarged, and contained an abnormal quantity of fat, which rendered it very friable. kidney and even the heart muscles were similarly affected, but the

uterus and its contents were found to be perfectly healthy. conclusion arrived at was that the disease was due to a pletheric condition, leading to fatty infiltration of the organs, and the superabundance of fat was attributed to lack of exercise. The theory is that ewes provided with ample pasturage are able to obtain a plentiful supply of food without travelling any distance, and as the period of gestation draws to a close, the ewes become less and less inclined to take exercise. There appears to be no suspicion of contagion, and it seems to me highly probable that dietetic influences are really the cause of the trouble. On the first appearance of the malady the ewes should be placed on bare pasture, so as to compel them to move about in search of food. During the last month of pregnancy it is a wise precaution to keep the flock on short feed, and when the opportunity arises they should be given an occasional run on a grass paddock or an early sown cereal crop. In every way possible the ewes should be encouraged to exercise their muscles, and thus use up the fat that accumulates and interferes with the functions of the internal organs. Personally, I have little faith in the medicine chest for diseases of this kind. If the disease can be detected early, it may be well to deplete the system by bleeding and the administration of large doses of laxative medicine. But the employment of special drugs, such as liver stimulants, is of no avail.

"BUNT" AND "TAKEALL."

[An address delivered before the Conference of Lower Eyre's Peninsula Branches of the Agricultural Bureau by Mr. W. J. Spafford, Superintendent of Experimental Work.]

Wheatgrowing would be a much simpler and certainly a more profitable undertaking but for the ravages of a number of diseases. These diseases in all their forms result in the reduction of the total yield of wheat from a given area, and some of them at least in a decreased price for that grain is obtained; but as they exist in all wheatgrowing districts, doing a varying amount of damage, it becomes necessary to do all we can to reduce their ill effects to a minimum. This can only be done by utilising those methods proved to eradicate, or, at least, keep them in check, and to understand what the diseases are, their habits of growth, &c., and, indeed, everything we possibly can about them, with the hope of discovering new

methods of treatment, either more effective than those at present in use, or equally as effective but cheaper. These notes on some of our worst enemies in this direction have this object in view.

"Bunt" or "Stinking Smut' (Tilletia caries).

"Bunt," or "stinking smut," is the disease of wheat that would do more damage to the crops of South Australia if not controlled than any other, or possibly all the others combined. Even though most wheatgrowers make an effort to keep it in check, it still does much harm, and is the only disease that always does some harm to the wheat crops in every district. "Bunt" is a parasitic fungus disease, and as such is a plant that lives on the sap of the wheat plant, and is characterised by the whole of the inside of the grains of an affected plant being replaced by evil-smelling dark-brownish powder or spores. The damage done to the crop is the reduction of the yield through the grain being replaced by the "bunt balls" or collections of "bunt" spores, and the lessened value of the grain for milling purposes, because when the spores, which have a very offensive odour and a dark color, are mixed with the flour, its color and odour are spoilt.

LIFE CYCLE OF "BUNT."

In a few words, the life cycle of this plant "bunt," like all the smuts, consists in the spores, which are equivalent to the seeds of higher plants, germinating in the soil by sending out slender mycelium threads. These threads enter into the young and tender wheat plants through their pores, grow up between the cells of the stem, enter, in the case of "bunt," the ear of the plant, and produce fertile branches. These fertile branches produce the spores, or black powder already referred to, inside the skin that should have covered the grain.

INFECTION OF WHEAT CROPS BY "BUNT."

As the collections of spores are contained in the skins of the wheat grains, and these are held by the glumes or chaff of the wheat heads exactly as if they were sound grains, the diseased heads are harvested with the healthy ones, and the spores of the "bunt" are mixed with the good grain at harvest time; any of this grain used for seed is already infected by the disease, and given ordinary seeding conditions, the resulting crop will be diseased. This is the main infection for "bunt"—indeed, the infection of the seed is the only one of any account in ordinary practice, and if not brought about through the crop being "bunty," it is often done by using machines already covered with spores, or by putting the grain for seed into bags that had previously held "bunty" grain.

PREVENTIVE TREATMENT FOR "BUNT."

The life history of the "bunt" plant shows us three periods in its life when it might be possible to kill it, and so prevent injury to the wheat plant, namely:—(1) After the spores have germinated and before the mycelium threads have entered the young plant; (2) while the wheat plant and "bunt" plant are growing up together; and (3) when the spores are on the wheat grains to be used for seed.

- (1) After the germination of the "bunt" spores, and before the mycelium threads have entered the young wheat plant, there will possibly be found some way to kill the threads of the "bunt"; but at present nothing can be safely used at a reasonable cost to prevent the wheat plants from being infected on the soil. We sometimes see happen in the soil what we would like to reproduce cheaply; when the seed is sown in soil that is quite dry, as far as we can see, we often get clean crops of grain from untreated "bunty" seed. This is because there is enough moisture in the soil to germinate the bunt spores, but not enough to start the grain, with the result that there is no host plant for the threads of the fungus to enter, and so it dies.
- (2) The first parts of the mycelium threads to enter the young wheat plants die as the wheat gets well above ground, so that most of the threads in a diseased plant are near to the top of the plant, and none below the ground nor near it; this being so, it might be possible to clear a crop from the trouble at this stage. Professor Perkins, when Principal of Roseworthy Agricultural College, thought so some years ago, and had experiments conducted with this in view. Here he had plants grown from artificially infected seed cut off as close to the ground as possible at various stages in their growth, hoping that the mycelium threads died sufficiently early to be able to free the plants from disease, and still have time for the crops to develop properly. The crops were certainly freed from the fungus, but the cutting off had to be left so late that in a district like Roseworthy there were few springs moist enough to make a full crop after such a late cutting. This, so far as feeding off the crop was concerned, settled all chances of it being effective in any of our "early" districts.
- (3) The task of finding a preventive treatment for this disease when the spores are on the seed is much simpler than in the other two cases. Here what we have to find is something that will cheaply prevent the "bunt" spores from germinating without injuring the wheat seed. A number of methods of doing this have been discovered, chief amongst which are the use of heat and the applica-

tion of fungus-killing liquids. The surest method of completely killing all "bunt" spores and not injuring the grain in the least degree is the heating treatment, usually done by the use of hot water. This treatment consists in dipping the bags of grain in water at a temperature of from 130 degrees F. to 134 degrees F., and leaving at that temperature for 10 minutes; this is an excellent theoretical method of treatment, but there are very few farms that have the conveniences necessary to keep water within this very limited range of temperature—below 130 degrees F. will not kill the spores, and above 134 degrees F. will kill the wheat.

Next to the hot water treatment comes the use of a solution of copper sulphate or bluestone, which, if intelligently handled, is efficacious. The reason I give it second place is because it is a very cheap method, generally understood by the farmers of this State, the material itself is so cheap that it is seldom adulterated, and if adulterated it is easily recognised as such.

The treatment of seed with a solution of copper sulphate to be effective in the killing of the "bunt" without injuring the grain rests mainly on the two following points:—(a) The strength of the solution in water, and (b) the thorough wetting of all the grain.

- (a) The solution should be at least what is known as a 1 per cent. solution, and not more than a $1\frac{1}{2}$ per cent. solution, except in exceptional cases. These strengths are represented by 1lb. copper sulphate in 10galls. of water for a 1 per cent. solution, and $1\frac{1}{2}$ lbs. copper sulphate in 10galls. of water for a $1\frac{1}{2}$ per cent. solution. One per cent. is strong enough if the seed to be pickled is not very badly infected, $1\frac{1}{2}$ per cent. makes it a little surer, but is unnecessarily strong in anything but bad cases, and over $1\frac{1}{2}$ per cent. certainly kills all the "bunt," but also reduces the germinating powers of the grain rather considerably.
- (b) To thoroughly wet the grain with the solution some method must be used that rubs the grains well together; if this is not done air bubbles remain on the surfaces of the grains, and many spores of the fungus could nestle under these and never become wet. This can be illustrated by dropping a handful of grain into a bottle containing some solution, when the air bubbles on grains are easily seen, and if the grain be left in the bottle for a week the bubbles will be found to remain intact. That each of these air bubbles might cover a number of the spores is easily recognised, if you remember that it takes from between 2,000 and 3,000 of them placed alongside one another to extend lin

The best method of rubbing the grains together so as to break these air bubbles is by using a shovel to turn a heap of loose wheat on a floor after pouring the requisite amount of solution on the This method will necessitate the use of about 24galls, of solution to a bag of seed, and should be turned over from three to five times. Where no suitable floor is available, the next best method of pickling with a copper sulphate solution is to put about 1bush, of seed in a bag, tie loosely, and immerse the bag in the solution for five minutes or so. There are a number of "pickling" machines on the market, most of which rely largely on the fact that all unbroken "bunt" balls and other light material floats on the surface of the liquid, and can be skimmed off. This is certainly a great advantage when the seed is dirty and badly "bunted"; but it is only one part of the operation, and really not as important as rubbing the grains together to get them thoroughly wet. Seed that has been "pickled" with a bluestone solution can be left almost indefinitely before sowing it, provided that it was thoroughly dried before rebagging it; indeed, the germination of "pickled" seed that has been allowed to dry and kept for some time is usually greater than if the seed is sown soon after "pickling."

FORMALIN.

Another liquid used fairly largely in Australia as a preventive to "bunt" is formalin. This to be effective should be at least a 1 per cent. solution, i.e., 1lb. of commercial formalin in 40galls. of water. When this substance has been used the grain should be sown when still damp, immediately after pickling; if allowed to dry it should not be sown for at least a fortnight, or if it becomes necessary to use the seed before that time is up, it should be thoroughly wetted with water. Once grain pickled with formalin has become dry, its germinating power gets less and less for a week, but after that time it gradually improves until one month after treatment. Formalin is a solution of a colorless gas in water, so that it is easily adulterated. In commercial formalin this should be a 40 per cent. solution of formaldehyde gas in water; but some formalin supplied to farmers at Nhill one year, on analysis, only showed 2 per cent. formaldehyde. Formalin is an effective pickle when guaranteed material is used and when ordinary care is taken, but because of its liability to adulteration, and the need of immediately sowing the grain, bluestone at the present is the more reliable of the two.

TAKEALL (Ophiobolus graminis).

This disease is becoming increasingly troublesome to wheatgrowers in many of the farming districts of the State, but as it becomes better understood its ill effects will be very considerably reduced. The disease is a fungus growth living on and so affecting the young wheat plants, and should rather be known as "wheat stem killer" than "takeall," as it mainly affects the bases of the stems of the wheat plant, and when present to any great extent is so severe on the plants that they only grow a few inches high before dying back. In the field it affects patches of the wheat crop, and can be recognised by the affected patches being more or less circular in shape, with their centres quite bare, and the plants in the diseased circle gradually improving until the healthy plants on the edge of the ring are reached. The affected plants are usually easily recognised by the fact that the bottom 2in. or so of the stems is more or less covered with a brownish powder. This latter means of recognition is of importance to the farmer, as the affection of wheat with which this disease is most often confounded is the result of climatic action, and usually spoken of in this State as the "blighting off" of the wheat crop. At one time, and to a lesser extent at present, everything that resulted in the dying back of the wheat crop was known as "takeall," but we are gradually growing away from this error. The "blighting off" of wheat crops is more or less common in some seasons in some districts, and is characterised by the dying right back of individual plants and patches of plants in strong luxuriant crops, and is caused by the moisture being dried out of strong, sappy plants through some climatic cause, quicker than the roots can make it good from the soil. If "blighted" plants be examined, they will be found to have dried right down to the soil a clear shiny yellowish color all the way, whereas, as was already pointed out, plants affected with "takeall" are covered with a brownish powder or stained brown.

It has been the experience of most farmers, especially in low rainfall areas, that once a field has been affected with "takeall," if wheat be grown there as the next crop, even on fallow, it will be affected by the disease, and very possibly have a worse attack than the previous crop. Also, that unless something be done to check the disease, wheatgrowing will have to be given up on that particular land for a time, and some other crop grown.

INFECTION OF THE WHEAT CROPS BY "TAKEALL."

As this parasitic fungus lives on the stems of the wheat plant, especially at the base, and as the badly affected plants do not produce heads of grain, it is probable that the grain harvested from affected crops and used for seed the following year is not infected with the spores of the disease. The infection of the crops is most

likely brought about in the soil, more particularly from the stems of the plants that are buried when the soil is being ploughed.

PREVENTIVE TREATMENT FOR "TAKEALL,"

- (1) As the straw left after harvesting an affected wheat crop is the most likely means of infection, the first step in the eradication of the disease should be the burning of the stubble. This will actually burn much affected material, and in places at least will kill many spores on the underground stems and roots by the heat generated.
- (2) As the fungus has been found on many of the plants that are usually found growing on our wheat lands, properly working the fallows. keeping them free from all weeds, will tend to reduce the disease.
- (3) One crop that will grow more or less well wherever wheat can be grown well—the oat crop—is but seldom, and then never badly, affected by this disease. This being so, when wheat crops are affected, the disease can be checked on that land by the growing of oats instead of wheat for a few seasons, especially if this is done on well-worked fallow land. The oats not being readily attacked by the fungus, tends to starve it out of the land.
- (4) Until the fungus causing the trouble was isolated a few years ago, it was usual in this State, at any rate, to consider the disease as being a mechanical one. It is not long ago that a common saying amongst farmers was, "Late fallow brings 'takeall," and also "Ploughing in a lot of straw or rubbish brings 'takeall." These two things—late fallow and ploughing in much straw—certainly appear to encourage the disease, so much so that I personally believe that the holding of the disease in check depends more on the mechanical condition of the soil than on anything.

The first method given of checking the disease—the burning of affected straw—does away with the second part of mechanical fault encouraging the disease, i.e., the ploughing in of much rubbish. This burning of our straw is wrong in any system of farming, and more particularly so under a system like ours, where we burn up the organic matter very quickly by bare-fallowing the land; and it should only be done (after the land is properly cleared of its natural growth) when the "takeall" disease has been prevalent. When the disease has been checked, the waste of organic matter due to burning should be made up by being extra careful to get as much as possible into the soil.

The reason that late fallow and ploughing in much straw encourages the "takeall" disease rests on the fact that in most seasons

they do not tend towards soil conditions ideally favorable to the growth of wheat, particularly when the wheat is in its earlier stages. when the disease is most active. From studying the disease for some years now, I am convinced of the fact that even in soil more or less badly affected with this disease, if the wheat crop gets a really good start, and continues in good healthy growth, there will be hardly any evidence of the trouble. This healthy growth depends very largely on the soil being in a state of good mechanical condition. and late fallow and much dry organic matter in the soil as a rule by no means give mechanical condition good enough to promote this In its simplest form the ideal seed bed for wheat consists of soil that has been ploughed up and then so worked that only the ımmediate surface—2in. to 3in.—is loose, and the soil immediately under it firmly compacted together. It is in a seed bed such as this that wheat will give its best yields, other things being equal, and I feel quite convinced that if seed beds like that described are always attained we would hardly know what "takeall" is. In the ordinary operations of bare fallowing obtaining this seed bed is one of our main objects, even if it is done in most cases unconsciously, and if the land is ploughed early, the rains that fall compact the under surface by running the particles together, and we cultivate the surface of the land to keep it free from strong crusts and from weeds. These operations get us somewhere near the ideal seed bed. in the case of late fallow, the ploughing is usually done after the heavy rains of the year are finished, and so not enough rains fall throughout the time between ploughing and seeding to compact the under-surface soil. This leaves the soil, as it also does when a large bulk of organic matter is ploughed in, with more or less large spaces in the under layers, which, when the roots of the wheat plants reach them, naturally give a check to the growth of the plants, and unfortunately, to make it worse, this check to the plants comes just at the time when the fungus is most active, and when the wheat plants In all land that is cleared, i.e., free from stumps, the are weakest. producing of good mechanical condition of the soil, or an ideal seed bed for wheat, can be brought about by the use of land rollers. this disease spreads, the use of rollers is becoming more necessary, and instead of depending so much on the rains that fall after the seed is in the soil to compact it together, as is the common practice at present, rolling the land will become just as important and necessary an operation as is harrowing. In practically all seasons a heavy rolling of the land is advantageous, but it is an essential operation when heavy rains have not fallen on the fallowed land.

SUMMARY.

"Bunt."

- 1. "Bunt" is a fungus disease affecting wheat crops, and is characterised by the presence of evil-smelling dark-brownish spores taking the place of the whole of the affected grains except the outside skins.
- 2. Wheat crops are usually infected on the seed before it is put into the soil.
- 3. The only practicable method of eradicating or checking "bunt" is by treating the seed with a solution of a fungicide.
- 4. A 1 per cent, solution of copper sulphate takes pride of place as a farmer's method of treatment.
- 5. For best results this solution should be poured on heaps of loose wheat on a floor and mixed, until thoroughly wet, with shovels.
- 6. When no floor is available, 1bush. butts of the seed should be immersed in the solution for a few minutes, or else be pickled with the help of a machine made for the purpose.
- 7. Grain is better pickled with bluestone some time before the sowing of it.
- 8. A $\frac{1}{4}$ per cent. solution of formalin is a good pickle, provided the grain is sown whilst still damp.

"Takeall."

- 9. "Takeall" is a fungus disease affecting wheat crops in more or less circular patches, and is characterised by the presence of dark powder or stain at the base of affected straws.
- 10. Infection with this disease appears to come wholly from the soil, particularly from the straws of affected plants.
 - 11. All straw from affected crops should be burnt.
- 12. Land should be bare fallowed early and worked well to keep it free from weeds.
- 13. Oats should be used as a change crop with wheat on land that has shown signs of the disease.
- 14. Good mechanical condition of the soil at seeding should be aimed at, so that the young wheat plants are strong enough to grow away from the parasite.
- 15. Rolling the land heavily should be resorted to whenever it is doubtful if the under surface is well compacted together.

THE BROOD MARE.

[An address delivered by the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S., etc.) before the Conference of Northern Yorke's Peninsula Branches of the Agricultural Bureau, held at Kadina.]

In addressing a Conference at Kadina one is speaking to men who, as a rule, have a better idea of a brood mare and her treatment than is the case in many districts in South Australia, for Yorke's Peninsula has long been noted for its horses and its breeders. A clean, strong air, feed plenty and good, a limestone soil to develop bone and feet have much to do with this, and judgment and selection for a market have, perhaps, more.

The following remarks are not laid down as strictly authoritative, but are more or less the outcome of the speaker's own experience coupled with a certain amount of technical education relative to the horse, and should any remark not meet with approval, the Conference will benefit by the expression of such, as there are two sides to any question, and it will be well to discuss them.

THE BREED.

The breed of mare is entirely a matter of one's enoice, but throughout these remarks the speaker has in his mind's eye the possibility of evolving a type of mare more suitable for the South Australian farm than the fixed types of Great Britain, a type that is broadly described as medium draught, that type which recent events have brought into prominence in the Old Country in the vales of Yorkshire and the coombes of Devon, which is spoken of as the old style pack mare.

In a recent number of the Agricultural Journal there appeared a plate of a Percheron filly demonstrating the lines sought for; and, should any think such is too light, her weight at 3 years was over 1,400lbs, which is generally taken to be the weight of a heavy draught. Whatever her breed, it will be an advantage to have a pure-bred mare, and possibly the Shire mare will suit our purpose better than the Clyde, and where the crossbred mare has to be used, as in the great majority of cases she will have to be, it will be a great advantage to have a strain of blood in her pedigree. Where the crossbred mare is shapely and suitable she will come into profit, but where she is palpably a mongrel, it is a waste of money to pay for a good stallion and rank folly to use a bad one.

THE AGE TO BREED.

The age at which a mare should be bred from was admirably dealt with at the Adelaide Congress some two years ago by the present Principal of Roseworthy College, and anyone in doubt as to whether a mare is too old or too young can have their doubts specifically set at rest by a reference to it. Speaking personally, I have rather a weakness for breeding from three-year-old mares, although that practice was decried in the address alluded to, and rightly so from a physiological point of view, but from an economic one it has its advantages, and even physiologically it seems to me that it is not entirely without them, as it tends to make the mare more matronly. With regard to old mares, I should be inclined to go on breeding from them until they ceased to do so if they were of the type I required; and suppose a mare of 10 or 12 had never been bred from, I should have no hesitation in commencing to breed from her; if her legs are those of a mare 40 or more, her constitution should be at its prime still.

I have never found any direct evidence to substantiate the popular idea that a foal from an aged mare will have an aged expression, and I have seen numerous examples to the contrary.

THE SHAPE OF THE MARE.

The shape of the brood mare is a most essential factor; she must be compact, a big mare looking small—the opposite is useless as a brood mare—low on the leg and deep in the chest, so that she is very deceptive under the standard, standing much higher than she looks. She should be all muscle and vigor, not fat and lymphatic, with straight upper and lower lines. She will have to carry her foal on her belly wall, so the floor need not sag like that of a poddy calf; she will need Her hind quarters tone in those muscles when bearing her foal. should be roomy and, above all, muscular. Width between her haunch bones must be balanced by the power a well set on tail indicates as existing in the muscles of the loins both above and below the spine; they will all, especially those below the psoas muscles, be very important when the young champion is coming into the world. Her face must be that of a happy, good-tempered mother, with its fine skin and bright expression, with energy expressed in every quick movement of the nostrils and ears, but without a trace of silly nervousness. should be as active as a cat, for while she is carrying her foal she will have to look out for herself and him in the many little accidental tight places that one of a team is bound to get into.

SOUNDNESS.

Soundness is an absolute essential, and the handmaid of shapeliness. The mistaken policy of breeding from any sort of mongrel mare, sound or otherwise, is leading this State into serious horse trouble, for most hereditary unsoundnesses do not develop until the horse is well in working years, say at 5 or 6, and he may have worked all right on the farm till then, and when sold for a good offer, the deal may have been made in all good faith, but he turns out badly, and the dealer avoids that farm on his next round.

The great law of breeding, "Like begets like," is only too true of the brood mare, and it is a very mistaken policy to keep a mare for breeding because she is no good for anything else. Accidents which deter a mare from work need not exclude her from the stud, but it is very doubtful if it is good economy to keep such a mare about except in very exceptional cases.

TEMPERAMENT.

The temperament of the brood mare is as important a point as her shape and soundness. Above all, she must be quiet; not lazy or piggish, but easy going, not readily upset, always willing to do her bit, and perhaps a bit more than that—which when in foal she must not do—but never anxious to take the load of the whole team on her own collar. She must be of a motherly disposition, no putting the ears back and lashing out when another comes alongside her; for one day it may be her own foal, and the greeting result in a broken leg. Her motherliness should be confined to her own offspring; the mare that organises a cheer-up society for all the foals in a paddock is altogether too fussy, and is not likely to be popular with other mares.

On the other hand, the masculine-headed mare with well-developed tusks, even if she gets in foal—which is problematical—will probably think the foal can fend for himself while she attends a discussion on the disadvantages of barbed wire or some kindred subject, and he will have a very rough time and short milk allowance. Mares of this disposition had better be shifted out of the stud.

TREATMENT.

The treatment of the brood mare should be essentially that of a member of any well-regulated team, except that work of a jerky nature, shifting heavy loads, clearing stumpy ground, and so forth must be avoided, and in the later stages of pregnancy she had better be on the outside of the team, and must not be put between the dray shafts. She is better for steady fair work right up to foaling; the custom of giving her a spell in the middle of her pregnancy, and bringing her in to work off fat that may have accumulated is not wise. Changes of work and feed often upset the digestion, which is more readily disturbed during pregnancy, with the result that the foal is displaced, and a difficult foaling follows.

In the yard she should not have the chance of rushing up narrow gangways or of crushing up to her feed with the mob, and projections, such as rails and posts, must be removed. In the paddock her mates must be carefully chosen, mares which do not get on well together being put in different paddocks. Some geldings are a regular nuisance to mares, attempting to look after the foals and getting into mischief which sometimes results in a fight. The doubtful gelding, which may be a rig, must be kept away from the brood mares altogether; his antics may at any time cause them to slip foal, while he is often inclined to savage the foals.

FEED.

Feed, like treatment, must be on commonsense lines, remembering that regularity is most essential, changes in quantily, quality, or times are almost sure to upset the in-foal mare, and may result in her slipping or displacing the foal. If she is not working, green paddock feed is best for her, but if she is in work she should have her usual diet, precautions being taken against constipation, which is the root of nearly all the troubles likely to affect an in-foal mare. Extra bran is good, occasional mild doses of Epsom salts are useful, but avoid molasses for the in-foal mare; its use is calculated to upset digestion and to rob the foal of oxygen that it should get through its dam's blood.

SERVICE.

The question of service may be left to the stallion's groom if he is a man of experience; if not, do not believe anything he says. The novice at the game is full of wierd notions gathered in various bars from individuals of much loquacity and little knowledge. A practical difficulty arises with a horse on his round, physiologically he is more likely to get foals from his early morning services, becoming sexually exhausted as the day wears on, while the mare is more likely to conceive if put after her day's work, so that there must be a certain amount of give and take between the owners of the animals.

Although heat may exist for several days, the period during which the mare is sexually receptive is often limited to a few hours, which are usually those prior to the commencement of passing off from heat, and the service is more likely to be successful at the middle of heat than either early or late. Repeated service is of no extra value in case of successful copulation, and is wearing for the horse.

In case of a mare consistently failing to conceive, she must be examined and, if necessary, "raked," that is, the neck of the womb must be dilated with the fingers before service, and it is well in such cases to swab out the parts with a warm solution of baking soda of the strength of a good pinch to a pint. A wet mare is more likely to conceive if served at the foal heat—that is the season which occurs usually

between the 9th and 11th days after foaling, as early as the 6th in blood mares—than if she is served at a later heat.

Complaint is sometimes made of mares "breaking service" at the sixth or ninth weeks after service. This is quite a physiological occurrence, and arises from changes in the growth and attachment of the embryo to the womb. It occurs more frequently in mares that are forced to take service at the intermediate periods, when slight heat may be showing, and should the slipping occur, it is better to allow the mare a rest for one heat at any rate before putting her to horse.

THE SIGNS OF PREGNANCY.

The signs of pregnancy are the cause of more debate and display of lore than almost anything else on the farm, many heated arguments occurring as to whether a mare is in foal or not. Methods of discovering this are at times curious and at others undesirable; among the latter is the custom of pouring cold water into the ears with a view to noticing whether she shakes her head or not.

Watching the near side for movements of the foal after the mare has had a drink of cold water in the early morning will not result in definite news until the foal is more than half gone, by which time there should be other and more satisfactory symptoms. The appearance of barbs under the tongue can hardly be accepted as evidence that a mare is in foal, because they can be seen under the tongue of a gelding, as they are valves at the opening of salivary ducts. It may be allowed, however, that in in-foal mares they may be a little more turgid than normal.

The most satisfactory signs are the disappearance of the periodic heats, although in isolated cases these may occur; the gradual swelling of the belly, which may be distinguished from the poddiness of overfeeding by being more diffuse and not following the line of the execum from the loins to the breastbone on the off side; the swelling of the udder and loss of wrinkles on it; gaining flesh and becoming milder in temper and somewhat sluggish at work.

Various methods of manipulation are at times suggested, and they are best left alone. Punching the supposed situation of the foal is not calculated to improve his position, and does not reveal with any certainty whether he is there or not. Examination through the vagina is almost certain to bring about a loss of the foal, while a similar procedure through the hind bowel will as a rule be unsatisfactory if not dangerous, and in either case the position of the foal will not be what is usually depicted in books, for, instead of being in the normal position he adopts at birth, he will be lying on his back with all his legs tucked up, and the only available part to feel will be the back of his head.

Attention at birth is a wide enough subject to require a special opportunity to deal with it, but, in conclusion, it may be said that when foaling is due the mare should have every attention, and not be aware that she is getting it. Fussing about the mares with a lantern, either in paddock or yard, is only one degree worse than forgetting to look round the last thing at night and the first thing in the morning. Should things have gone on all right in the meantime, no help will be required; and should they not, the sooner help is rendered the better for all parties. The act of birth is so quick in the mare that the foal's supply of life blood ceases when it begins, and he must breathe to live, so that nothing is gained by delay and much lost.

Whatever has to be done should be done deliberately and without flurry, and it should be remembered that while he was growing there was plenty of room for the foal in the womb, and if he has to be adjusted it can be done more easily there than in the passage; push is of more use than pull till he is in the right position. Every 1916-17 foal is likely to grow into good money, which will be wanted on the farm, as elsewhere; so a cheap investment likely to yield good interest may be found in a good brood mare.

THE ORANGE IN SOUTH AUSTRALIA

[An address delivered before the Lower Northern Branches of the Agricultural Bureau by the Horticultural Instructor, Mr. Geo. QUINN.]

The original home of the orange still arouses much controversy amongst historians of this fruit, but all the evidence adduced tends to indicate that it was situate in the region of Southern Asia, probably within the tropic zone. The contention that the tree has its origin within the borders of that climatic belt is certainly supported by the fact that whenever it is grown under such conditions of humidity and heat the fruit tends to produce seeds in great abundance, and the plant to propagate and maintain itself without the aid of mankind.

I have not been able to discover the date of the introduction of the orange into South Australia, but as a number of varieties existed in the mother State of New South Wales before the foundation of our own, it is very probable this fruit received attention from some of our enterprising pioneer fruitgrowing colonists. In his book, "Three years in South Australia," from 1839 to 1842, a Mr. J. F. Bennett says six varieties of oranges were in cultivation at that time. The experience obtained locally over a period of upwards of half a century now enables us to review the conditions of soil and climate under which this fruit appears to thrive best. This claim, however, must always be qualified by the fact that our methods of cultural treatment are still more or less in a nebulous condition, and subject to the possibilities of improvement under every accretion to our knowledge of this tree and its needs.

ORANGE-GROWING DISTRICTS.

The localities in our State wherein the orange appears to thrive comprise a comparatively limited area, but this doubtless could be vastly extended, in so far as climatic conditions are concerned, were other desiderata forthcoming. This tree at present is grown on the coastal plains to the west of the range which extends in an irregular fashion north-easterly from below Aldinga on the shores of Gulf St. Vincent to the Barossa district behind Gawler, and its cultivation also creeps up along some of the narrow sheltered valleys which project into these hills both on the western and southern sides. In practically no other coastal area is the orange found until the southern spurs of the Flinders Range are reached, approximately 150 miles farther north. Here, within a distance of probably 20 miles of the shores of Spencer's Gulf, around the towns of Laura, Crystal Brook, along Beetaloo Valley, and upon the westerly slopes in the vicinity of Baroota Creek, and considerably farther north at Stirling North, where the Saltia Creek debouches upon the plain, small orange groves, placed in sheltered positions, give evidence of the suitability of the atmospheric conditions for this fruit. The inland districts tested thus far lie along the valley of the River Murray, beginning in a modest manner near Murray Bridge, and extending at intervals to the boundary of the State, from whence it is continued into the adjoining States of Victoria and New South Wales.

CLIMATIC CONDITIONS DESIRABLE.

The atmospheric conditions which appear to favor the orange may be said to be an absence of extreme cold, either in the shape of frost or the refrigerating action of cold winds. Providing a sufficiency of moisture envelops the roots the so-called hot winds do not seem to exercise a highly deleterious effect upon the tree. The extreme degree of cold which the tree is able to withstand undoubtedly varies with the condition of its vegetative activity at the time. American investigators claim that green fruit is injured by 3 degrees of frost or a temperature of 29deg. Fahr., but ripe fruit will remain uninjured until 6 degrees, i.e., 26deg. Fahr., is registered. The resistance of each part of the tree increases with its age and solidity, hence the newly-opened blossom is the most vulnerable, the solid trunk the least so. Ordinary sweet orange trees in a dormant condition have been recorded to have withstood the cold uninjured when the thermometer registered 20deg. Fahr., or 12 degrees of frost, which is more severe than ever recorded in South Australia, and the Satsuma mandarin when in a dormant state, at the Florida Experiment Station, withstood a temperature of 16.5deg. Fahr. It is very seldom indeed the orange-growing districts in this State experience 6 degrees of frost, and invariably the lowest readings occur in winter (July), when our citrus trees are, or should be, free from unripened wood and foliage and the fruit well advanced towards maturity.

Soil Conditions.

The other desiderata for the well-being of this tree may be summed up in a sweet, well-drained soil, evenly supplied with moisture throughout the year, so that the roots are warm in winter and cool in summer. In the South Australian orange-growing areas those referred to as coastal districts experience approximately from 16in. to 24in. of rainfall per annum, most of which falls in the cool seasonfrom April to September. This, combined with the proximity of the gulf waters make for a higher degree of humidity in the atmosphere than is experienced inland. The winter temperature records show occasional frosts of a very light character. On the Adelaide Plains June averages 3deg., July 5deg., and August 3deg. over a period of 55 years, the lowest recorded in that period being 10deg. The summer temperature ranges above 100deg. Fahr. on a very few days indeed. At the same time, the lower temperature which ranges during the last three months (June, July, and August), in conjunction with the rainfall, whilst the fruit is maturing undoubtedly affects the character of the same. The orange is grown in these localities over the courses of long obliterated streams, or those from whose silted up surfaces the present creeks and rivers have been forced aside. soils are composed of detritus washed from the ranges out of which the streams passed into the gulfs. Excavations show them to be made up of layers of waterworn boulders, gravel, loam, and silicious sand, with a fair proportion of organic matter intermixed. In the State orangery, located at Adelaide, on the banks of the Waterfall Gully creek, this formation remained unaltered at 23ft. below the surface. In some of these alluvial soils the loam and organic matter combined are not sufficient to prevent too rapid an underdrainage during dry summers. In others, on the contrary, these components form too large a proportion of some of the soils, or the presence of a substratum of clay renders the soil mass too compact for the winter's rain to pass through it sufficiently fast to avert injury to the roots of the orange tree. Hence we find in an orangery of a few acres in extent all gradations of quality in the growth of the tree and the fruit it bears, which are directly attributable to the soil conditions, or perhaps it would be more correct to say combined with the treatment given the soil by the cultivator.

In the inland districts, referred to as the Valley of the Murray, the climatic conditions differ in some very marked respects. mean temperature at night during the winter season is lower, and during the daytime higher than on the coasts. The rainfall between April and September does not reach one-half that received on the coasts, viz., 51 in. against 14 in., and in consequence a drier atmosphere prevails. The soils wherein the orange is grown consist of coarse sandy loams-almost pure coarse sands intermixed with a small amount of clay, lime and organic matter would, perhaps, prove a more accurate description. These overlie calcareous strata which are found at depths varying from 1ft. to approximately 5ft. below the surface. These soils provide a free foraging area in which the roots travel with great freedom, more especially near to the surface. From these soils the heat absorbed in the daytime is rapidly passed by radiation at nightfall, and in consequence great fluctuations in temperature occur, more particularly in the surface layers.

VARIATIONS IN FRUIT FROM COAST AND INLAND.

The fruits produced in these two zones of climate differ considerably. The more uniformly low temperatures of the nights and days on the coast during the period when the fruit is growing, the comparative absence of severe frosts as it approaches maturity, combined with the grosser form of food supply in the soil, tends to produce a fruit fairly coarse in the skin, with sugar and acid contents more evenly balanced, whilst the outer rind partakes of a paler tint. tendency to bear a great number of fertile seeds so noticeable in the vicinity of the tropics, is, however, not appreciably present. typical oranges produced in the inland districts are thinner and smoother in the skin, and contain less rag or blanket around or between the loculous segments. The sugar contents are apparently more in evidence than the acids, and the outer rind partakes of a deeper orange red tone than the same variety when grown nearer the coast. There is a tendency for both the rind and the pulp sections to contain less moisture than is the case with coastal fruit, and possibly this accounts to a certain extent for the good carrying qualities

displayed by inland grown oranges. I find in Professor Coit's work on "Citrus Fruits," issued in 1915, these observations tally very closely with Californian experiences under approximately similar conditions.

VARIETIES GROWN.

The commercial oranges grown here in South Australia consist of varieties of three species, viz., the sweet orange (Citrus aurantium sinense of Gallesio) known as the Malta or Portugal orange; the Seville or sour orange (Citrus aurantium acida of Rumphius); and the Mandarin or (Citrus aurantium nobilis of Loureiro). It is true we have the deciduous orange of Japan (Citrus trifoliata), and the so-called Poorman orange, the botanical identity of which I have yet to learn, but these can scarcely be termed commercial types, although the latter is used successfully in the making of marmalade.

Of the sweet oranges, there are several sorts known as Navels, on account of the umbilical shaped mark at the apex of the fruits. Of these, the Washington Navel and its sports, known as Thompson's Improved, Navelencia, Golden Buckeye, and Golden Nugget are the best. Of these, the Washington Navel has established the best reputation in our dry atmosphere. Thompson's and Navelencia resemble each other in many respects, yielding a more spherical, even-sized lot of fruits than the Washington. The last-named two sorts are much paler in the skin, that of the Buckeye fruit being marked by a longitudinal streak of deeper orange red. The Nugget has a peculiarly willowy dwarf habit of growth, and is too slow to utilise the growth of the lemon stocks sometimes used here. These navel oranges usually have the essential organs of their flowers aborted, so that fertilisation apparently is not completed, and seeds rarely develop from the ovules.

Of the seed-bearing varieties, immense numbers have been selected, named, and propagated. In our State collection some 42 of these varieties have been fruited. Besides such well-known kinds as Siletta, St. Michael, Sabina, Paramatta, Rio, Mediterranean Sweet, Maltese Blood, and Late Valencia, a very high opinion has been formed of Nonpareil, Joppa, and Ponton's Red, which latter seems to be an improvement upon the Maltese and other so-called Blood oranges. One or two seedlings of Australian origin, such as Parker's Seedling and Paterson River, are also of promising quality.

Amongst the Mandarin type, the Dancy's Tangierine for our climate, stands pre-eminent, although for flavor the kid-glove-like Nobilis is not approached by any other Mandarin. It is, however, rather too small for commercial work. The Emperor and Scarlet Emperor are typical of the large loose-skinned sorts, and unsuited to long-distance transportation. The so-called Thorny—which is

thornless—and the Beauty of Glen Retreat are valuable, and sweet orange hybrids—Shipping, Fewtrill's Shipper, and Jac Improved—are particularly firm and handsome. The first-name very sweet, the latter rather acid, but its skin is of the richest sky, cannot to say crimson color, to be found in the fruits of the family. Amongst the dwarf Japanese strain Satsuma is from growing on account of being the earliest of all Mandarins to right, and with us next to it comes Parker's Special. The latest ripeing of our 19 varieties of Mandarins is the large, somewhat coarse king of Siam.

Of the Seville types, we have three varieties; the small or common, which comes true from seeds; the Flat Seville, a much larger, pale, yellowish-green fruit, and a large smooth rich orange-colored variety, much handsomer than either of the above.

PROPAGATION OF THE ORANGE.

Most, if not all, of the first orange trees introduced into this State were rooted layers. Now, they are all propagated by means of budding upon seedling stocks. Seeds intended for sowing should not be allowed to get dry after being removed from the fruit pulp.

The question of stocks for orange trees is a very disputed one. The concensus of opinion appears to run, both in America and here, somewhat on the following lines:—For free, well-drained land, which does not become very cold in winter, the Seedling Sweet orange is preferred. For soil subject to retain much of the winter's rain and which is also somewhat wet in summer, the Seville is chosen; for exceedingly wet lakeside land, almost swampy and peaty in character, the trifoliate Japanese orange. The lemon is not favored here, as it is accused of creating strong upright growth in the orange, and the grossness is transmitted to the fruits. It is also stated to be very subject to the mal de goma, or collar rot. The principal drawback to the exclusive use of the Seville stock is that it dwarfs the tree worked upon it, and that more particularly if used in land not well supplied with moisture.

NURSERY SOILS FAVORED.

It is not necessary here to elaborate the process of propagation, but I should like to say that a citrus nursery should be located in surface soil altogether too shallow and adhesive for the permanent growth of orange trees. In such soil the nursery tree does not make a few large penetrating roots only, but a reasonable number of horizontal roots, which emit large numbers of fibrous roots. The tree grown in this soil is small and hard, and, when lifted, most of the roots are saved without undue labor in excavating. When lifting young trees

as many roots as possible should be saved, and, what is most important, kept moist until replanted. As every leaf is actively drawing moisture, first from the sap stream and probably later from the water of organisation, it can readily be understood that unless the leaves are removed in proportion to the roots lost, the plant's vitality will rapidly become lowered, and that perhaps beyond recovery.

PREPARATION OF LAND FOR ORANGE TREES.

The soils in which the orange has given satisfaction here have been described already, and I wish only to repeat that in preparing the land an effort should be made to deepen and sweeten the surface layers at least to a depth of 2ft. Even the sandy loams of the Murray Valley are often compacted like cement at very little more than 1ft. below the surface, although the first 6in. may be loose and This sub-layer should be broken and aerated, whether done by implements or explosives. It is said the orange is a surfacerooting tree, but one may pertinently ask does not this depend upon the possibilities before the roots? I have followed orange roots 6ft. down in a vertical direction in the alluvial soils referred to-roots as thick as a man's wrist—and how much deeper they penetrated I could not discover. In clearing new land, all roots of native shrubs and trees which would not thoroughly decompose in a year should be removed before planting, as the risk of infection by "root rot fungus (Armillaria mellea) is considerable, as the orange growers at Harvey, in Western Australia, discovered to their great loss.

PROTECTION AGAINST WINDS.

As previously mentioned, the position chosen should be immune from severe frosts and protected against the cold south-westerly or south-easterly winds, either by the contour of the country or by living shelter belts, or by both. This point is most important, as without proper shelter all other desiderata may be present in perfect order, and yet the orange trees will not thrive, particularly on the wind-exposed borders.

WHEN TO TRANSPLANT.

It has been previously emphasized that all foliage should be ripe when the time for frosts is expected. Hence the planting of orange trees is urged in the springtime. The sign of returning activity, as indicated by the emergence of small, pale bud points in the axils of the over-wintered leaves tell us the temperature of the soil and air are rising, and this is the guide as to when to begin to lift our orange trees if we wish to take advantage of the first flush of growth. It is true, where the trees have not to be transported far, they may, when lifted carefully, be transplanted throughout the summer

months, but the autumn planting is deprecated owing to the fact that to thrive the orange must start into activity as soon as set into the orchard, and this means the putting out of young twigs and foliage, which takes several months to harden to the condition capable of withstanding the sharp frosts which often occur in early winter.

The orange is a gross feeding plant, as evidenced by the multitude of fibrous roots it possesses, and if the soil be comparatively impoverished it is a good plan to mix two or three pounds of blood manure or bone fertiliser or a wheelbarrowful of decomposed farmyard manure into the soil immediately beneath the spot where each tree will be planted. These quantities should be spread over an area of about 3ft. square and worked thoroughly into the first foot and a half of soil. The young tree should be set so that it stands a couple of inches higher out of the soil than it stood in the nursery, and the soil should be afterwards settled into position with a good soaking of water given without delay. Never set the roots of the young trees into dry soil and leave them unwatered for a single hour, but rather give them a bucket of water at once if more is not available for the time being.

When after several months the land has settled back to a normal condition around the tree it should be possible to discern the crown of the main roots where they emerge from the base of the trunk. Should the weather prove dry and hot, bind a bundle of straw loosely around each stem wherever any are exposed. A mulch of straw, litter manure, or finely broken dry soil should be made to cover the soil above and beyond the spread of the roots for some distance around each tree as soon as possible to keep the ground cool, and the maxim to never let a young tree need moisture should be observed.

The tender shoots arising from young trees need special protection against cold winds in the spring and early summer, and in cases where sand drifts occur a strip of wheat may with advantage be drilled down the centre between the rows, keeping away at least 6ft. on each side from the line of trees. This must be cut for hay in due season and the stubble disked over, but not ploughed under. These remarks apply to the Murray Valley lands particularly, but on the coastal areas a row or two of maize planted and irrigated will make excellent shelter in a few weeks, and such protection is often desirable to protect the first spring growth where the area planted is a wide one over which the boundary shelters do not sufficiently afford a break.

TILLAGE OF THE ORANGERY.

The tillage of the orangery is a subject around which a considerable difference of opinion ranges. It is contended that this tree is

a surface rooter, and that deep tillage is to be deprecated or the active roots will be broken. I am prepared to grant that if the orangery is on shallow soil or deep soil which has been shallowly prepared and the fertiliser has been worked into the first three or four inches only, whilst the irrigation water has been applied in very shallow furrows, which in turn have been poorly broken by the harrows or planet junior, then the roots will be near the surface, because they have been encouraged to come there at first, and the gradual consolidation of the subsoil under such treatment keeps them there. If, on the other hand, the land be deeply prepared and sweetened by the admission of air, if the manure be put deeply into the soil, and the irrigation furrows made so that the water is put down to the roots, and then the tillage such as will keep it there as long as possible, there is little fear of the roots coming up into the first few inches of dry surface land. The shallow methods first outlined have been practised here for the first half century of our orange growing, and the results speak for themselves. These results have led many of our citrus growers to place the productive lifetime of our orange trees at 30 to 40 years, but in the light of the experience of older countries one must emphatically pronounce against such a We cannot attribute this to the vagaries of our climate altogether, as our experience of ordinary droughts should teach us to seek how best to mitigate their effects. I personally refuse to blame the climate, but argue that we must reform our methods of treating the orange tree if we wish it to live as long and prove as profitable in fruit production as is the case in the other citrus-growing countries of the world. In tillage, it is suggested we open the soil deeply in early winter and leave it to sweeten and weather and the rain to penetrate deeply during the time the orange trees are not actively growing but are yielding up their stored vitality in maturing the fruit crop. If we wish to put organic manures or slowly available chemical fertilisers such as potash or crushed bone manures into the land we should put them in as deeply as possible at this period. In practice when ploughing, they are dropped by machine or hand upon the floor of the deep furrows just outside the spread of the foliage and buried for the winter's rain to set up further decomposition in them, knowing that what is dissolved will be carried by the diffusion of moisture through the deeper layers of the soil. spring, weeds that have grown, or cover crops sown early in winter will be buried by as shallow a furrow as possible, and throughout the summer a fine dry tilth maintained with scarifiers. The approach of consolidation in the sub-layers should be carefully watched and steps taken to break it by the subsoiling plough or explosives. I am convinced the consolidation and souring of the subsoil is the principal cause of the early decline of our orange trees. A poor penetration of air and water means a poor supply of plant food made available, and the trees die back from sheer lack of nutriment.

IRRIGATING ORANGE TREES.

The orange is not grown commercially in this state without irrigation. In the coastal areas the rainfall is supplemented by small volumes of water usually applied by the ring system to each tree individually.

In the Murray Valley the rainfall may be said to be regarded as only supplementary to the moisture applied by irrigation, hence the land is watered in furrows and the trees only incidentally dealt with in the process. In the case of the coastal country, the water supplies are seldom sufficient if the natural rainfall is short. It is true, with the reserve in the subsoil of a winter's rain, of which 14in. or 15in. fall between April and September, this ring system gives fair results if the tillage be good, but when the rain does not come during that period in sufficient volume to sink deeply the ring system yields only a starvation allowance to small portions of the root system, which probably ramifies the whole sub-surface of the orchard. It is obvious the remedy for this would be to water the whole area, but unfortunately the supply usually comes from wells whose replenishment depends upon the rainfall, and simultaneously with the need for an increased volume comes a decreased supply. Doubtless in the future better supplies will be procurable, but in the meantime our efforts should be directed to making the most of what we have. We can do this to a considerable degree by increasing the water-holding capacity of our soils, improving their texture in this respect by tillage and the addition of extraneous substances. It is a well-known fact that a soil rich in organic matter will hold more water than one in which there is an undue preponderance of mineral matter. the organic content of our soils should be kept up to a high pitch by the judicious use of farmyard manures or green crops. There is very little doubt that whenever peaty swamp soil is available, as it is in the lower Murray Valley, its use on the adjoining sandy lands would be worthy of extensive trial. The secret of successful orangetree growing would appear to depend on maintaining an even supply of moisture about the roots so that the tree never wilts or curls its leaves. The best way to gauge this condition is to test the soil from time to time, and not let the danger line be passed, or the subsequent watering may excite growth, to the detriment of the growing crop. It has been truly said that the orange fruit which has been affected by drought when growing never properly regains the lost ground, remaining smaller and more acid than it would otherwise

have been. In applying water, I suggest it be run into deep trenches, and a day or two later, when the soil has lost its adhesiveness, these trenches should not be merely filled in, but be torn up, bottom and sides alike, before the land is finally levelled back with the dry dust on top. In small gardens the prong hoe, or fork does this work, and if we have not yet an efficient horse-drawn implement, there is a chance for someone to devise one. I am satisfied, from upwards of 20 years' experiment, that if this practice be followed no hard pan forms beneath the furrowed area. If a surface mulch of litter or manure be spread beneath the tree, on no account should the water be allowed to flood over or through it. The value of such a mulch lies in its dry porous character, which makes it a poor conductor of moisture between the soil surface and the air.

Pruning.

The orange does not appear to need the systematic pruning deemed necessary to the well-being of deciduous fruit trees. When the tree is young I believe in allowing its lower shoots to shade the trunk as thoroughly as possible, and gradually, as the top increases in its spread, lower limbs may be trimmed off to avoid brushing the soil or interfering with cultural operations. If this course be followed, each tree must receive careful attention from time to time to prevent any of the permanent limbs growing across the centre, to the displacement of some other limb with a greater claim to the position. Such interloping branches should be cut out promptly. As the tree reaches greater maturity of size, the inner laterals should be thinned out so that all the framework can be seen from within like the ribs and handle of an open umbrella. The canopy of foliage and small twigs should envelop the framework as the cloth does that of the umbrella. From time to time a number of latent buds on this inner frame will burst into strong growth, and these, when not needed to fill up the canopy, should be mercilessly suppressed. These are commouly called suckers or water shoots, and most writers urge their destruction without exception. Like all water shoots. some o these may at times be utilised in the framing of the tree, and that more particularly when they arise during the first few seasons after planting the orangery. Often a newly-planted tree will remain quite inactive, or even begin to dwindle, until some of these shoots arise beneath or from the more hardened portion of the small limbs of which the head of the tree is composed. These shoots will frequently form the crown of the tree, and their advent marks a new era of development in its chances as a whole. These shoots may often be pulled across and tied into a blank space in the head of the tree, and thus help to make a well-balanced top to an erstwhile flat or lopsided tree. It is sometimes desirable to thin out the living twigs in the denser spots around the canopy of foliage, and in doing so those twigs which carry old fruit sears should be removed.

The chief neglect in our orange tree pruning appears to be the lack of systematic removal of worn out dead brushwood which accumulates in the top. It is true the decay passes but slowly downwards into older limbs, but these hard spikelike dry twigs under the action of the wind frequently scratch and injure the young tender oranges as well as the leaves to a serious degree. It is usually considered that early springtime (August and September) is the best season to prune the citrus trees here, as that is just as the sap is moving upwards. There is this advantage to be claimed for it, where much exposure of bark is likely to arise from the removal of limbs, that before the sun gains its highest power the gaps in the leafy canopy are likely to be covered by the expansion of new foliage. The dead brushwood should be cut out just whenever the grower has time to do it. When pruning use sharp shears and saws and make all sections smooth and flush with the bark of the limb from which the severed shoot arose. All wounds over an inch in diameter should be carefully covered with thick white lead paint or grafting wax to exclude moisture from the fibres of the exposed wood.

MANURING THE ORANGE.

From the earliest period of their cultivation these trees have been manured in this state, but as far as I am able to ascertain no systematic work has been conducted over a period of years sufficiently long to set up a definite standard of fertilising for the varying conditions of soil and climate found in the orange-growing districts of the State. At present we can only adhere to what may be termed basic principles upon which to formulate any trials we may undertake. Two or three points may be emphasised. First among these we can take it for granted that in a hot dry climate our soils under clean tillage, and more particularly under the intense form which irrigation implies, organic matter tends to too rapidly diminish in the soil. This balance must be corrected by the judicious use of farmyard manure, vegetable or peaty soils, or by the growth of green crops which are to be incorporated back into the soil. Secondly, our South Australian soils are, with few exceptions, deficient in available phosphoric acid; and thirdly, the sandy lands, such as are found in the citrus belt along the Murray Valley, are invariably low in potash. For supplying the phosphoric acid, combinations of bonedust and dissolved bone, known as bone super., ar suggested in preference to the mineral superphosphates commonly

used in wheatgrowing. When available, sulphate of potash is recommended for supplying this constituent in preference to the muriate or chloride, and for nitrogen, blood manures and sulphate of ammonia are recommended. The potash and phosphates should be applied with the early winter tillage, and the nitrogenous blood or the ammonia either with the spring ploughing or in the irrigation furrows of the early summer season. Until potash in purified forms is again available, all ashes from prunings or wood fires should be saved and placed in an unleached condition into the orchard soils. It is difficult to specify formulas to meet all cases, but in each 5lb. of fertiliser it is suggested the proportions of 2 of bonedust, 1 of dissolved bone, and 1 each of the potash and nitrogenous manures be compounded. Of such a mixture it is suggested each tree receive from 1lb. to 10lb. per dressing, according to its size.

PESTS.

Practically no highly injurious fungi have attacked the orange trees in this State, but a few insects are troublesome. Chief amongst these the red and black scales (Aspidiotus aurantii, of Maskell) and (Lecanium oleae, of Bernhard). The orange aphis also attacks the young shoots just as the blossoms are opening in the spring. the trees are young the nocturnal curculio beetle (Otiorrhynchus cribricollis) gnaws the young leaves and twigs, often causing serious injury by stunting the tree. For red scale various spray washes, such as kerosine and other petroleum spraying oil emulsions or resin wash, are used with fair results, but the sovereign remedy is fumigation beneath a gastight cover with hydrocyanic acid gas. This work must be performed at night or on perfectly clouded cool days; the tents must be free from holes and reasonably gastight, and the charges of chemicals properly calculated to the sizes of the trees, and the generation of the gas carried out on approved lines. Our experience indicates the most successful killing of scale is done during the winter season, when the insects are dormant. As a basis for charging, the following quantities may be used:-For trees under 10ft. in height and diameter, use the cyanide of 98 per cent, strength at the rate of loz. to each 100 cubic feet enclosed, and gradually decrease the strength of the dose as the trees increase in height and diameter until an ounce is used for each 150 cubic feet enveloped within the sheet. For each ounce of cyanide of potassium use loz, of sulphuric acid of good commercial quality and 3oz. of soft water.

The cyanide should not be powdered, but in lumps from the size of a bean to that of a walnut, or even a little larger. The trees should be covered for not less than 45 minutes after the generation

of the gas commences. Due precautions must be observed in keeping, handling, and using these chemicals, as the cyanide and its gas are most deadly to human life and the acid corrosively destructive to flesh or clothing.

The black scale is usually troublesome upon densely foliated, strong growing trees. It does not appear to damage the trees to a serious extent, but creates vast quantities of honey dew, upon which the sooty mould fungus (Capnodium) finds a congenial home, covering the trees and fruits with its black smut-like debris. The remedy consists in thinning out such dense places, throwing them open to the sunlight, and spraying the trees occasionally with kerosine or prepared spraying oil emulsions. The olive green aphides may be killed by spraying them with tobacco and soap wash or kerosine emulsion, but usually a small parasitic ichneumon fly soon takes control and represses this pest. It is only in cases of serious infestation that resort to these artificial remedies becomes necessary against the aphis. The curculio beetle, being a leaf feeder, may be poisoned by spraying the foliage beneath as well as above with strong arsenate of lead, say 1lb. of paste in Sgalls, of water. A band of woolly sheepskin tied around the stem of each tree proves an effective barrier against the ascent of this wingless insect.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, May 10th, there being present Mr. F. Coleman (in the chair), Professor Perkins, Messrs. W. J. Colebatch, T. H. Williams, C. E. Birks, C. J. Tuckwell, J. Miller, G. R. Laffer, M.P., and the Acting Secretary (Mr. H. J. Finnis).

Cornsacks.—A notification was received from the Minister of Agriculture to the effect that no action was contemplated by the Government in the direction of securing supplies of cornsacks for the coming harvest, as, from inquiries made, there was no reason to anticipate that importers would have difficulty in securing adequate supplies.

Means of Transit between Port Adelaide and Port Lincoln.—The following resolution, unanimously carried by the Conference of Lower Eyre Peninsula Branches of the Agricultural Bureau, was referred to the Minister of Agriculture, with a request that, if possible, some relief might be given these settlers:—"This Conference is of the opinion that the Government should either provide for a State line of steamships between Adelaide and Port Lincoln, or make provision for the through carriage of goods from Port Adelaide to any station on the Eyre Peninsula railway, with a through booking charge."

Simultaneous Destruction of Sparrows and Starlings.—Laura Branch requested the Board to urge on the Government to fix a period for the simultaneous destruction of sparrows and starlings. Mr. Laffer mentioned that fruitgrowers and vinegrowers especially could effect the destruction of large numbers of starlings by poisoning a few cases of grapes with strychnine and distributing these around the gardens at the end of the fruit season. Simultaneous action was desirable, but he did not think this could be attained by legislative enactment. The Board concurred in this opinion.

New Branches.—Approval was given to the formation of a Branch of the Bureau at Mintaro, with 50 foundation members. A request from Pungonda Siding was held over until the termination of the war.

Life Member.—The name of Mr. S. Bottrill of the Narrung Branch, was added to the list of life members.

New Members.—The following names were added to the rolls of existing Branches:—Yeelanna—H. Solly; Elbow Hill—Dansi, R. S. Mills: Geranium—C. Cowled, E. L. Cowled, I. Hughes; Dowlingville— L. A. Burford; Morchard—Chas. Longbottom; Northfield—F. Chardon; Elbow Hill-T. Wildman; Two Wells-L. A. Cordon; Mount Barker-P. J. Pope; Myrla-Carl Fettke, F. W. Schloithe, Carl Ernst; Bute—B. B. Craigie; Berri—P. L. Grove; Strathalbyn—F. G. J. Abbott, A. S. Abbott, T. Nevin; Bundaleer Springs-S. Cooper, A. Lawrie; Waikerie-J. Smith, R. Roewesoft; Hawker-A. J. Ireland, B. Mansom, C. F. Pyman, B. Feineler, C. Hirsch; Woodleigh-H. Paech; Uraidla and Summertown—J. S. Williamson, A. J. Pope; Penola—W. A. Clifford, H. G. Strong; Naracoorte—W. A. Williams; Milang—W. Overall; Sandalwood—O. J. Eisemann, T. S. Wood, T. Dickson, J. R. Kealy, C. A. Richie, J. H. Richie, H. Standfield, F. H. Highman, E. Kalliske; Mypolonga—G. Horner, J. Nolan; Brentwood— Jas. Martin, S. Nankivell, J. Alderman, J. Babbage, sen.; Geranium-P. J. Flaherty; Canowie Belt-Les. Spavin, J. Nester, Syd. Schultz; Murray Bridge—B. A. Zeunert, A. Pinchbeck, A. J. Pinchbeck.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF MAY.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—With the exception of one good fall of rain on May 14th the month has been extremely dry. The temperature has been varied, ranging from bright hot days to bitterly cold east winds and frosts. Crops.—A fair area of grain has been sown, but this is not showing through the ground yet. Natural feed is still fairly plentiful, but consists of dry grass. Stock are in very good condition. Pests.—Foxes are numerous, and are doing damage amongst the young lambs.

Eyre's Peninsula.—The weather has been very disappointing. During the early days of the month temperatures reached over 80deg. Fahr. in the shade on no less than seven occasions. Up till time of writing (26th inst.) only 34 points of rain have been registered, and these from light showers during the period embracing 13th to 19th inst. During the last week weather has been changeable, but a general break-up is anxiously awaited. Crops.—A good proportion of available land was sown dry early in the month, but the unexpected light showers caused farmers to defer completion of seeding until more favorable conditions arrive. The seed that is sown is experiencing a hard tussle, as it received just sufficient moisture to save its life. Pests.—Crows are unearthing the germinating ont seeds. Parrots have been severe on the few cabbages and other small green patches about. It has also been necessary to treat young brassicas to keep the aphis in check. Miscellaneous.—Water carting is still necessary.

Kybybolite.—Weather has been mild and rather dry, only 50 points of rain being registered, and it all fell between the 14th and 20th. This fall, with the April rains, gave sufficient moisture for seeding, but it is remarkable how dry the ground has become towards the end of the month, and a further fall now would be very beneficial. Crops.—Perfect conditions have been experienced for seeding, and that work has progressed rapidly, many farmers having completed operations. Germination has been good; all crops sown long enough are up and looking well. Natural feed has made slow growth this month, but holdings generally are understocked, and there is no shortage. Stock about the same as last month; a good percentage of lambs is expected, and, although foxes are troublesome, they have not caused serious losses.

Turretfield.—Weather—May was rather a disappointing month from an agricultural point of view. Instead of a good soaking rain so eagerly looked forward to, only showers fell. One or two frosts were experienced, but on the whole the temperatures were mild. Crops.—Seeding has become general, though the land is not in the moist condition that farmers like at seeding time. The season, however, is opening so late that operations had to be commenced by those desirous of putting in a fair area. Natural feed is becoming scarce, and there is practically no green natural herbage for the lambing flocks. Stock.—Ewes are lambing freely, and the percentage of deaths is small. Horses and cattle are in fair to good condition. Pests.—Sparrows and starlings are more numerous than has been known in the district for some years past. A fair number of foxes have been trapped or poisoned.

Veitch.—Very dry weather conditions have been experienced in this district during the month of May, only 27 points of rain have fallen, which is considerably below our average, 1.46. Crops.—The fields that have germinated are holding their own in the sandy country, but the heavy flats are feeling the dry spell. Natural Feed.—A little dry scrub feed is still available. Stock.—All stock in healthy condition. Pests.—Rabbits are now making their appearance. Miscellaneous.—Seeding operations in the district are nearing a finish, and farmers are anxiously waiting a good fall of rain.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

ROLL OF HONOR.

Members of the Agricultural Bureau who are, or have been, serving with the Australian Imperial Forces:—

Rowell, C.B., Col. J. Amyton-Schulz, B. V. Arden Vale and Wyacca-Klingberg, J. E. Beaufort-Underwood, H. C. Beetaloo Valley-Heinrich, Richard Bartrum, Frank Belalie North-Napper, S. Hansen, Victor Bladon, T. B. Turner, S. Berri-Moss, H. B. Rogers, A. W. Napier, W. Day, Essington (Lieut.). Sapp, T. W. Steward, E. N. Chapple, W. N. Cook, J. P. Blackwood-Magarey, A. W. Sullivan, Sgt. H. Light, P. W.

Advisory Board of Agriculture-

Blyth—
Pratt, J. Howard
Bookpurnong East—
Lawrence, R. D.
West, D. J.
Crase, T. N.
McMillan, F. M.
Kingsborough, L. B.

Harris, J. B. Banks, H. A.

Booleroo Centre— Michael, H. D. Brooks, N. L. Nottle, J. B.

Borrika— Leadbeater, D. J. Jacobs, G. W. Brinkley—

Martin, A. R. Humphrey, H. D. Bundaleer Springs— Lawrie, N. H. Giles, Keith

Bute— Trengrove, T.

Butler—
Sedunary, A.
Morrison, H. J.
Dowie, D. M.
Morgan, J. G. S.
Parker, L.
Young, G.

Canowie Belt— Wedding, H. A. Sanderson, A.

Carrow—
Storrie, C.
Beare, F.
Anderson, P.
Norton, A. E.
Burtt, D. C.

Cherry Gardens— Jacobs, Hal Jacobs, Cliff

Clare—
Victorsen, Geo.
Cichon, C. H.
Menzies, Lieut, D.

Coomandook— Marsh, W. R. Williams, L. Guy, J.

Coomooroo—
Lillecrapp, G. B. (Corporal)
Avery, L. (Lance-Corporal)
Robertson, A.
Robertson, W.

Coonalpyn— Colliver, Wm. G. Coorabie—

Basnett, L.
COPPINS, H.
Cussion, W.
Fox, C. A.
Giles, B.
Gregory, A.
Hobbs, H. C.
Riddle, A. W.
Underwood, F. M.
Weatherill, W. A.

THE AGRICULTURAL BUREAU ROLL OF HONOR—continued. Crystal Brook-Julia-MIELL, A. (Lieut.-Col.) Carter. E. Billinghurst, E. L. Kanmantoo-Story, A. G. Downing, S. C. Burgess, F. E. Pym, P. L. Cygnet River-Shepherd, H. R. Miller, F. Downing, H. W. L. Hannam, J. G. J. Dowlingville-Mills, A. Mason, H. MILLS, T. Whittaker, L. Elbow Hill-Koonibba-Bunn, R. W. (Sergeant) Buteaux, G. Jenkins, G. J. Surfield, W. Koppio-Gardner, M. T. Wheeler, H. W. Howard, G. Surfield, P. Gardner, F. G. Forest Range-Kybybolite-Green, E. J. Schinckel, H. B. McLaren, S. R. Leishman, E. Porter, J. E. L. HAHN, A. W. Brockhoff, A. G. Geranium-Young, R. A. J. Davies, J. Toseland, C. A. Lameroo-Bowden, J. T. Grig, C. Glencoe-Laura-Agnew, H. A. Lowe, J. J. Glencope-Manning, R. C. Leighton-Oates. H. G. Retallack, W. G. Williams, E. S. Goode-Cordon, S. Morcombe, P. T. Lucindale-Packer H. Dow, P. W. Green Patch-Lyndoch-McFarlane, K. S. Morgan, H. Halidon-Maitland-Russell, C. A. Opie, J. L. Jones, O. W. Clark, W. F. D. Mallala-Westover, J. Moody, C. T. Hartley-Mantung-Forbes, J. L. Tonkin, A. E. A. Simcock, H. Stewart, D. Hookina-McNamara Bore-Cagney, F. Perriam. L. G. Inman Valley-Robertson, T. Parsons, H. M. (Major) Bennier, F. C. Tugwell, V. G. Tonkin, L. Wallmann, A. G. Perriam, R. V. Rose, R. Meadows South-Meyer, M. L. Pinches, A. L. Meyer, M. J. Bertram, W. H. Grovenor, S. J. Meningie-Iron Bank-Dainty, E. Warland, W. Coats, F. S. Milang-Coats, A. L. McMillan, J. Coats, G. S. Moar, A. Coats, L. A. (Sergeant) Saltmarsh, H. R.

THE AGRICULTURAL BUREAU ROLL OF HONOR—continued.

Miltalie— Wilson, M. H.

Mindarie—

Godlee, C. A. Angus, F.

Beckwith, M. R.

Mitchell—

Green, O. Green, J. Head, J.

Merchant, R. Ness, W.

Moonta-

Shaw, F. M. McDowall, M.

Moorlands— Spurr, R. U. P.

Morchard— Dawson, R. Kitto, R. E.

Mount Barker—
Fidler, B.
Choate, J.
Miels, Lieutenant
Rouse, G. R.
Anderson, V.

Mount Bryan East— Tralaggan, F. G.

Mount Compass— Skews, C. Conway, H. Clarke, W. J. Hicks, V. G.

Mount Gambier— McGillivray, D.

Mount Remarkable— Andrews, E. B. Botten, R. H. Clarke, D. H. Foot, F. Scott, C. Sheppard, E. Willington, E. M.

Murray Bridge— Ive, A. L. Rawnsley, J.

Naracoorte— Haynes, W. G. Manton, J. D. Gould, W. W.

Narrung—
Goode, G. R.
McNicol, F.
McNicol, J.
Stevens, S.
Barker, T.
Metcalf, C. H.
Powell, C. B.

Netherton— Mitchell, C.

North Booborowie—
Birks, W. R.
Morgan, E. J.
Phillips, F. L.
Harris, A.
Hannaford, V. R.
Simpson, A. G.

North Bundaleer—
Sanders, F. G. (Lieut.)
Shadforth, W.
Lambert, A.
Pitt, A.
Burgess, L.
Stephen, H.

Northfield— Kester, E.

Parilla— McCormack, D. Small, F. R. Lee, E. G.

Penong— Pearson, C. H.

Pine Forest— Carmen, R.

Pinnaroo—
Warren, E. A. (Capt.)
Whittle, H. C. (Corp.)
Reed, A. I.

Port Broughton—
Routley, C. W.
Allchurch, E. B.
Allchurch, E. H.
Fletcher, A. J.
Routley, G. H.

Port Elliot— Henderson, W. Snell, G. J.

Port Germein— Raglass, N. A.

Renmark—
Brown, C. S.
Birks, E. H.
Williams, B. H.
Berriman, H.
Kelsey, H. S. (Second Lieut.)

Riverton— Kelly, J. G. Kelly, H. C. Owen, N. Arthur, G. Mills, A. B. Kelly, A. E. Bailey, A. THE AGRICULTURAL BUREAU ROLL OF HONOR—continued.

Roberts and Verran— Hoar, D. McCallum, J. C. Whittaker, H. P. Imhoff, F.

Rosenthal— Newmann, W. A.

Salisbury— Coker, A. C. Webb, H. A.

Salt Creek— McNamara, V. K. Rivetts, J.

Sherlock— Wheaton, S. Stringer, H. Roberts, H. Stringer, A. Stringer, C.

Stirling's Well— Fletcher, H. T. Bowers, A. Bowers, E.

Strathalbyn— Eckert, J. G. Tucker, A. H.

Tintingra—

Wendt, A. K. (Lieut.)

Bell, J. (Cpl.)

Helling, J. A.

Bell, T. N.

Henderson, G. K.

Kneale, W. J.

Brooks, H. A.

Dall, F.

Waikerie—
Minnis, T. L.
Charlton, N. N.
Ballantyne, A. V.
Milner, F. E.
Vasey, W. E.
Minnis, T. L.
Dunstan, K.
Norman, K. A.
Henderson, R.
Mathews, W. J.
Stokes, J.

Warrow— Wilson, J. E. Morgan, T. Watervale— Ward, O. Parker, G. W. Hamp, J. R. Wilkawatt—

Neville, M. A.
Ivett, A. V.
Altus, F. W.
Brooker, H. H.
Bowman, D. G.
Oram, J.

Wirrabara— Francis, H. L.

Woodleigh— Day, F. Ridley, W.

Wollowa---Mallyon, A. K.

Wynarka—
Wright, C. B. R.
Rackham, J. R.
Thomson, S. O.
Brown, E. O.
Shultz, J. W.
Williams, G. R. B.
BYARD, D. A.
Masson, G. G.
Murphy, J. W.

Yabmana—
Pengelley, J. Y.
Pengelley, S. J.
Robertson, W. M.
Robertson, J. M.
Robertson, J. Y.
Beinke, A. R.
Frost, M. K.

Yadnarie—
Parbes, R. H. E.
Fitzgerald, F. G.
Yaninee—

Turly, G. E. Christian, A.

Yeelanna—
Smith, L. B.
Smith, E. B.
Smith, W. M.
Habner, L. F.
Davis, F. H.
Dollard, T. F.
McDonald, R.
Cronin, M. A.
Cronin, M. P.

Kain, R. Gordon, W. H. WESTON, L. H.

The names appearing in capital letters are those of members who have died in the country's service.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on June 1st:-

BUTTER.—The month of May was dry until the end, when a general rain set in. This has been so far light, but if soon followed by further downfalls will be of very great benefit to the dairying industry in this State. Firm butter markets continue to prevail throughout the Commonwealth, and in sympathy with a further advance in the eastern States, values here are higher than a month ago, "Alfa" now being 1s. 9d. per lb.; "Primus," 1s. 8d. per lb.; choice separators and dairies, 1s. 5d. to 1s. 6d. per lb.; store and collectors, 1s. 1d. to 1s. 3d. per lb.

EGGS.—The extremely mild weather that ruled during the month, coupled with the increasing attention being paid to the poultry industry, has had the effect of stimulating supplies, so that the market is appreciably lower than at the beginning of May. Very little export trade is being done, local demand being sufficient to clear the markets. The closing prices for the month are:—Hen eggs, 1s. 7d.; duck, 1s. 8d. per dozen.

Cheese.—Demand is good, both for local and export, so that the market at the moment is bare, with a firming tendency. Values during the month ruled at from 9d. to $9\frac{1}{2}$ d. per lb. for large to loaf.

Bacon.—There has been a further marked increase in supplies of the live animal, but demand has improved, and prices remain unaltered. Best factory cured sides 1s. ½d. to 1s. ½d. per lb.; hams, 1s. 1d. to 1s. 2d. per lb.

HONEY.—The easing in values has stimulated consumption for both prime and second grades. Fair quantities have come forward, and well-flavored clear samples have sold at 5d. per lb.; second grades, 3½d. to 4d. Beeswax is very saleable at 1s. 5d. per lb.

ALMONDS.—Supplies are arriving a little more freely, but purchasers readily clear all parcels coming forward. The market shows an advance to:—Brandis, 9d.; mixed softshells, 8d.; hardshells, 4d.; kernels, 1s. 6d. to 1s. 7d. per lb.

LIVE POULTRY.—Certainly more attention is being paid to this department of the farm, and the quantities forwarded to the markets throughout the month show a very substantial increase on last season, and with excellent demand ruling nice prices have been secured. Good table roosters are worth 4s. to 4s. 6d. each; nice conditioned cockerels, 3s. 6d. to 4s. each; plump hens, 3s. to 4s. each; ducks, 3s. 6d. to 4s. 6d. each; geese, 5s. to 6s. each; pigeons, 9d. each; turkeys, from 9d. to 11d. per lb. live we ght for fair to good table birds.

POTATOES AND ONIONS.—There has been no appreciable alteration in the potato position as regards price. Supplies, however, are now continually coming from the Ballarat district instead of Gippsland, as heretofore. Onions.—Nearly the whole of Adelaide requirements have been purchased from the Colac district of Victoria, and prices have been easier, in sympathy with the lower market in Victoria. Quotations—Potatoes, £7 to £8 per ton of 2,240lbs. on rail Mile End or Port Adelaide; onions, £4 15s. per ton of 2,240lbs. on rail Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of May, 1916, also the average precipitation to the end of May, and the average annual rainfall.

Station.	For May, 1916.	To end May, 1916.	to end	Av'ge. Annual Rainfali	Station.	For May, 1916.	To end May, 1916.	Av'ge. to end May.	Av'ge. Annual Rainfall
FAR NORTH	LOWER NORTH—continued.								
Oodnadatta	0.04	2.56	2.27	4.76	Spalding	2.02	4.17	5.61	20.25
Tarcoola	0.41	0.46	2.39	7.58	Gulnare	1.80	3.82	5.29	19.74
Hergott	0.11	0.50	2.53	6.04	BundaleerW.Wks.	1.94	4.67	4.77	17.29
Farina	0.22	0.91	2.85	6.70	Yacka	1.29	2.73	4.78	15.27
Leigh's Creek	0.15	0.41	3.74	8.66	Koolunga	1.49	3.63	5.03	
Beltana	0.27	0.83	3.89	9.22	Snowtown	1.33	3.05	5.09	
Blinman	0.56	0.90	5.24	12.83	Brinkworth	1.60	3.48	4.59	15.48
Hookina	1.23	1.75	-	—	Blyth	1.34	4.33	5.48	16.34
Hawker	1.19	1.40	3.92	12.22	Clare	1.96	5.20	7.67	24.30
Wilson	0.87	0.89	3.91	11.78	Mintaro Central .	1.48	4.16	6.40	21.99
Gordon	0.79	1.03	3.12	10.26	Watervale	1.99	4.91	8.45	27.17
Quorn	1.14	1.29	4.41	13.78	Auburn	2.03	4.10	7.83	
Port Augusta	0.71	1.56	3.72	9.46	Hoyleton	1.30	2.81	6.04	17.96
Port Augusta W.	0.76	1.47	3.28	9.36	Balaklava	0.87	2.89	5.62	16.03
Bruce	0.83	0.93	3.05	10.01	Port Wakefield	0.87	2.59	5.16	
Hammond	0.85	1.03	3.93	11.46	Terowie	1.08	2.12	4.38	
Wilmington	1.51	2.19	5.95	18.26	Yarcowie	1.09	3.07	4.46	13.91
Willowie	1.13	1.26	3.87	11.90	Hallett	1.24	2.41	4.87	
Melrose	1.63	2.57	7.61	23.04	Mount Bryan	1.37	3.98	4.48	
Booleroo Centre	1.24	1.70	4.97	15-83	Burra	1.00	3.19	5.59	
Port Germein	1.60	2.12	4.76	12.84	Farrell's Flat	1.19	3.43	5.93	18.87
Wirrabara	1.68	2.73	5.95	18.91					
Appila	1.27	1.73	5.07	15-08	West of	or Mur	RAY R.	ANGE.	
Cradock	0.71	0.76	3.61	10.86	Manoora	1 1.41	1 4.15	5.69	18.09
Carrieton	0.96	1.39	3.95	12-22	Saddleworth	1.38		6.54	L
Johnburg	0.59	1.06	3.24	10.21	Marrabel	1.37	1 -	1	1
Eurelia	0.82	1.50	4.30	13.24	Riverton	1.21		6.62	
Orroroo	0.98	2.19	4.65	13·42 12·25	Tarlee	1.28	1	5-79	1
Black Rock	0.99	2.03	4.24		Stockport	1.11		5.06	15.89
Petersburg	0.99	2.13	4.37	13.07	Hamley Bridge	1.11	1 -	5.40	16.45
Yongala	1.23	1.99	4.34	13.94	Kapunda	1.32			19-67
North-East					Freeling	1.29	4.83	5.58	17.85
Ucolta	0.74	1.45	1	1	Greenock	1.40	5.14	6.49	21.46
Nackara	0.19	1.26			Truro	1.05	4.63	5.85	
Yunta	0.39	0.50	3.23	8-22	Stockwell	1.24	3.74	6-01	
Waukaringa	0.44	0.50	3.00	7-94	Nuriootpa	1.50	4.60		
Mannahill	0.45	0.76	3.23	8.46	Angaston	1.24	4.41		1
Cockburn	0.44	0.48	3.28	7.97	Tanunda	1.16	4.71		
Broken Hill, NSW	0.61	4		1	Lyndoch	1.23	4.10	6.55	23-01
	•	•	1 000	1 000			Dr. 4 mars		
	WER N				11		PLAINS		16.88
Port Pirie	1.60	2.20	5.82	13.21	Mallala	1.00	4		
Port Broughton .	1.63	3.17	4.89	14.33	Roseworthy	1.05		1	
Bute	1.14	2.89	4.96	15-42	Gawler	1.38			1
Laura	1.83	2.96	5.70	18.22	Two Wells	0.94	1		
Caltowie	1.68	3.38	5.44	17.27	Virginia	1.28	1		1
Jamestown	1.60	2.89	5.28	17.46	Smithfield	1.66	- 1	1 - ~~	
Gladstone	1.74	2.84	5.06	16.00	Salisbury	1.08			1
Crystal Brook	1.61	2.80	5.10	15-62	North Adelaide	1.48	4		1
Georgetown	1.99	3.49	5-99	18-32	Adelaide	1.19		3	1
Narridy	1.70	2.94	4.46	16-79	Brighton	1.65		1	1
Redhill	1.65	3.39	6-38	16.79	Glenelg	0.99	3.33	0-10	1000
	1	1		<u> </u>	!!		1		

RAINFALL—continued.

Station.	For May,	To end May,		1 4 1	Station	For	To end	Av'ge.	Av'ge.
-	1916.	1916.	May.	Rainfal	Station.	May, 1916.	May, 1916.	to end May.	Annua Rainfa
Adelaid	e Plan	s—con	tinued.		West of Spe	NOWD'S	/		-
Magill	0.97	4.00	8.41	25.69	Strooler De-	MOEE S			ed.
Glen Osmond	1.33	5.77	7.57	25.26	Streaky Bay		2.26		15.3
Mitcham	1.17	4.50	7.30		Port Elliston	2.46	4.39		16-4
Belair	1.20	4.55			Port Lincoln	1.75			19.8
			,	1 = 5 5 2	Tumby	1.06	2.46	4.60	
Moun	r Lorr	RANG	ES.		Carrow	1.29	2.24	_	_
Teatree Gully	1 1.51	5.23		F 90'70	Cowell	0.70	1.38		11.7
Stirling West	1.94	8.14	8.96	28-19	Point Lowly	-	1.25	4.33	12.2
Uraidla	2.06	7.94	13.47	46-70				•	•
Clarendon	1.79	6.90	12.90	44-35	YORK	e's Pe	NTX: TT		
Morphett Vale	1.29	4.98	10.51	33.67			MINSOL.	А.	
Noarlunga	0.89		7.54	23.32	Wallaroo	1.49	3.88	5.07	14.0
Willunga		3.49	6.58	20.28	Kadina	1.67	3.37		15.8
Aldinga	1.19	4.91	8.32	25.98	Moonta	1.49	3.42	5.44	15.25
Normanville	1.27	3.60	6.44	20.34	Green's Plains	1.23	3.09	5.02	15.7
Yankalilla	1.31	3.97	6.62	20.65	Maitland	2.07	4.24	6.44	20.0
Cana Tarria	1.68	4.51	7.47	22.78	Ardrossan	1.29	2.77	4.61	13.89
Cape Jervis	0.89	2.11	5.11	16.34	Port Victoria	1.50	3.22	5.20	15.20
Mount Pleasant .	1.36	5.39	7.82	26.87	Curramulka	1.06	3.55	5.58	18.51
Blumberg	1.66	4.86	8.39	29.38	Minlaton	1.05	3.01	5.38	17.41
Gumeracha	1.71	5.90	9.65	33.30	Stansbury	0.93	2.53	5.39	17.08
Lobethal	1.39	5.34	9.68	35.38	Warooka	1.46	3.14	5.39	17.71
Woodside	1.19	4.80	8.74	31.87	Yorketown	1.11	2.76	5.39	17.47
Hahndorf	1.05	5.68	9.86	35.45	Edithburgh	0.90	3.00	5.51	
Nairne	0.97	4.22	8.74	28.83		1 0 00	3.00	9.91	16.48
Mount Barker	1.22	5.97	9.30	30.93	South	ANTO Co	T7		
Echunga	1.43	5.32	16.02	32.83		חמ תמש	OTH-EN	lst.	
Macclesfield	1.44	5.51	8.90	30.72	Cape Borda	2.60	5.68	7.44	25.09
Meadows	1.76	6.32	10.63	35.52	Kingscote	1.29	3.18	5.88	18.95
Strathalbyn	0.50	3.00	6.32	19.28	Penneshaw	1.47	4.04	6.80	21.34
					Cape Willoughby.	2.09	6.00	6.09	19.69
MURRAY	FLATS	AND VA	TTTOTT	1	Victor Harbor	0.64	3.47	7.16	22.18
Wellington					Port Elliot	0.59	2.83	6.71	20.33
Milang	0.67	2.43	5.20	15.01	Goolwa	0.57	3.90	6.07	17.93
Langhorne's Brdg	0.40	2.26	5.52	16.08	Pinnaroo	0.65	2.28	5.21	16.74
Tailem Bend	0.50	2.44	5.04	15.27	Parilla	0.51	2.38	5.21	10.14
Murray Bridge	0.80	2.11	-	- 1	Lameroo	0.45	3.00	5.05	10 25
Callington	0.67	2.20	4.95	14.32	Parrakie	0.50	1.89	5-05	16.55
Mannum	0.48	1.87	5.26	15.65	Geranium	0.60	2.54		
Polmon	0.46	1.32	4.31	11.67	Peake	0.74	2.28	_	
Palmer	0.57	2.50	4.70	15-60	Cooke's Plains	0.59	2.73	4.63	7 4 7 4
Sedan Blanchetown	0.80	2.26	3.96	11.92	Meningie	0.86	3.83		14.74
Fudundo	0.22	1.07	4.07	10-71	Coonalpyn	0.71	2.88	6.11	18-87
Eudunda	1.16	3.20	5.35	17.33	Coomandook	0.92	2.90	5.42	17.49
Sutherlands	0.71	2.28	3.03	10.60	Tintinarra	0.58	3.32	- 0-	16.80
Morgan	0.25	0.91	3.28	9.29	Keith.	1.09		5.97	18.78
Overland Corner	0.62	0.94	4.21	11.42	Bordertown	0.82	3.16	- 00	
Renmark	0.65	1.13	3.64	10-93	Wolseley	1.10	3.83	5-98	19.76
Loxton	1.40	2.26	-	_	Frances		4.29	5.50	17.72
			1	- 1	Naracoorte	0.73	3.36	6.04	20.74
WEST OF SPENORD'S COM					Penola	0.87	4.49	6.73	22.60
0 10m.			LF.		Lucindale	1.64	5.64	8.23	26.78
Eucla	0.70	2.24	4.59	10.13	Kingston	0.90	5.31		23.32
White Well	1.96	3.71	3.23	9-67	Kingston	0.92	4.68	7.53	24.73
owler's Bay	1.72	2.41	4.13	12-11	Robe	2.10	7.51		24.69
enong	1.71	2.61	1	11.93	Beachport	2.07	6.37	8.39	27-51
uuras dav i	1.62	2.39		~ 20	Millicent Mount Gambier	1.94	7.76		29-25
Smoky Bay	1.44	2.13	1		C. Nrthumberland	1.57 1.27	6.78	10.14	32.00

THE AGRICULTURAL BUREAU.

CONFERENCE OF SOUTH-EASTERN BRANCHES.

(Continued from page 916.)

The afternoon session was opened with a paper by Mr. George Riddoch (Kalangadoo), who dealt with stockraising and the variation of management necessary in his district, with a rainfall of nearly 30in. per annum, and a retentive clay subsoil. In the course of his paper, he mentioned that he had made a practice of adding turpentine to the salt which he gave the sheep, and this had had the effect of checking the development of intestinal worms, and encouraging a healthier constitution for the animals. The sheep or cattle breeder who had special qualifications and interest in his stock, he said, would reject animals which did not possess the recognised charac-The more he practised this, the better able would he be to work up to a recognised standard. The sheepbreeder should select the type best suited to the climatic conditions in which he desired to rear the animals. In this locality tussock grass grew, and as sheep would not eat this tough growth, it seeded and covered an increasing area of land. A limited number of cattle grazing in each paddock would check its spread, and after a while the tussocks would become fewer and the land become capable of carrying larger numbers of After testing the suitability of different breeds, he had come to the conclusion that the Romney Marsh sheep and the Hereford cattle did best in this neighborhood.

In reply to questions, Mr. Riddoch said his sheep had done better, grew to a greater weight, and were generally healthier since he had given them sulphate of iron, salt, and turpentine. General discussion followed.

SHORTAGE OF SHEEP.

An address was delivered by the Wool Instructor (Mr. Henshaw Jackson), who stated that during the past five seasons there had been a steady decrease in the number of sheep in South Australia, and at the present time it would be found that the total amounted to something like three millions only. This depletion of flocks was due to the drought, and the question to be considered was how were they

going to bring the number up to the normal, and maintain a permanent flock. The pastoralist would always be the main source from which the farmer would replenish his flocks from time to time. Therefore there was nothing to prevent the farmer keeping a flock ranging from 200 to 500.

The question the farmer raised was that in times of drought he was unable to provide feed for his sheep. This, however, was not a correct view. From the standpoint of simple maintenance, one ton of chaff would keep six sheep for one year. These sheep would produce a fleece and a lamb each, under ordinary circumstances. This would be found much more profitable than selling the hay, and there was the additional feature that the sheep enriched the land by their droppings. It should be made part of the business of the farmers to feed these animals systematically. The labor involved in feeding was not so great as was often imagined, for if 1lb. of chaff would do for one sheep for a day, they could feed 1,000 by putting out half a ton of chaff. Unless they could adopt this practice, he could not see how they could put their flocks on a permanent basis.

THE MARKET.

So far as he could see, there was never a better outlook for stock and wool. For a long time they could confidently look forward to prices that were considerably above the average of the past 10 years.

One difficulty that was apparent in connection with the establishment of flocks was the cost of the sheep. However, the profit to be looked for was not on account of the resale of the sheep, but from the annual increase.

The farmer after having made up his mind as to what breed of rams he was going to use, had no need to bother himself with the breeding problems. He would simply be a sheepraiser, and not a sheepbreeder. The sheepbreeder was always in possession of the stock, to which the farmer could go for building up his flock.

It would be to the farmer's interest to pay more attention to the crossbreeds. The Merino could be made a very useful farm sheep, but this would require a good deal of patience on the part of the man who took it up. The Romney Marsh was a good ram to use on the Merino for country that was likely to become inundated in winter. His particular fancy, however, was the Leicester. This cross produced quality in the wool. He failed to see that any benefit was to be derived by putting the short-woolled English breeds on the Merinos. They could certainly get a good lamb in this way, but if anything went wrong, they had nothing in the way of a fleece.

The farmer's policy was, therefore, to carry a flock of Merino breeding ewes, and according to the country in which he was situated, he could go on with the crossbreds, selling his wethers and keeping his ewes. If he were in a position to grow the class of fodder that was necessary to ensure a full flow of milk in the ewes, and secure a fat lamb, then he could use a short-woolled ram, which produced a first-rate mutton sheep, but from the point of view of wool, was an absolute mongrel, However, the danger was that the farmer would find in the second cross a fine type of animal that he would like to keep. If he did so, he would make a great mistake, for whereas when they were producing a comeback they were doing no harm, when they introduced, as their second cross, a sheep that had no similarity to the others, they were producing mongrels.

A number of questions were replied to by the lecturer.

POTATO CULTURE.

A paper on this subject (a resume of which will be published later) was contributed by Mr. R. Fowler.

NEXT CONFERENCE.

It was decided that the next conference should be held at Bordertown.



CONFERENCE OF MURRAY RIVER BRANCHES

The second annual Conference of Murray River Branches of the Agricultural Bureau was held at Murray Bridge on Wednesday and Thursday, May 17th and 18th. A large number of delegates attended from Renmark, Berri, Waikerie, Kingston, and Mypolonga, and in addition the Minister of Agriculture (Hon. C. Goode, M.P.), Professor Arthur J. Perkins (Director of Agriculture). Messrs. P. H. Suter (Dairy Expert), Henshaw Jackson (Wool Instructor), and W. J. Spafford (Superintendent of Experiments), also Messrs. F. Coleman (Chairman), J. Miller, and H. J. Finnis (Acting Secretary), of the Advisory Board, represented the Department of Agriculture.

FIELD TRIAL AT MYPOLONGA.

On Wednesday the delegates and visitors attended a field trial of implements, held at Mypolonga, and arranged by the Director of Trigation (Mr. S. McIntosh). On arrival of the launch at the Mypolonga landing, the party was met by the Chairman of the Murray

Bridge Branch (Mr. E. Nelson), the Hon. Secretary (Mr. G. G. Hall), and Mr. S. Kellett, of the Irrigation Department, and conducted round the settlement.

A trial of different makes of implements and machinery was then conducted under the direction of Mr. Kellett.

Delegates subsequently returned per launch to Murray Bridge, and at the request of Mr. Nelson, who presided throughout the Conference, the Hon. C. Goode, M.P., declared the Conference open.

MINISTER'S ADDRESS.

The Minister of Agriculture said the development of the Agricultural Bureau on the Murray had been quite recent—Renmark, the oldest Branch, having been formed in 1890, Ramco in 1897, and the others since 1912. The nature of the work, the community of interest, and the peculiar difficulties of the irrigationist, all combined to make the Murray settlement the phase of agriculture which would receive, perhaps, the greatest help from the Bureau. Like other institutions, the Agricultural Bureau was suffering considerably from the effects of the war, and more than 300 members were on active service. It behoved those who remained to keep up the interest in the branches, as the men who were engaged in the defence of the Empire were entitled to expect that the institutions they had helped to build up, and which they had left in a flourishing condition, should be maintained against their return.

RECLAMATION AND IRRIGATION.

In dealing with the development of irrigation along the Murray the Minister said that of the areas which had been reclaimed, 3,558 acres had been allotted in 203 blocks. At an early date it was intended to commence the preliminary work in connection with the reclamation of Lake Albert, which covered about 41,000 acres. Ral Ral, which was also to be taken in hand in the near future, would provide an area of from 30,000 to 40,000 acres of splendid irrigable country.

It was the intention of the Government to pursue a vigorous policy in regard to irrigation works, as it was recognised that settlement of the land adjacent to the Murray was the best means of meeting the conditions which would arise at the end of the war.

The financial difficulties were considerable, but in his opinion it was far better to borrow money to pave the way for the settlement of those areas, even at a high rate of interest, than to restrict developmental work. It was proposed, so soon as the finances permitted, to establish an experimental farm for the purpose of investigating the many problems with which irrigationists were faced. The Government was

going on with the locking of the river, and when the nine locks were completed there would be a navigable river with a minimum depth of 9ft. 6in. from the mouth to Wentworth, a distance of 518 miles. The question of salt water in the Lower Murray was a problem that would have to be faced, and the Government were prepared to face it. Major Johnston had been particularly requested to report on the question, and no doubt he would evolve a scheme which would overcome the trouble, so that the settlers near Murray Bridge would have permanent fresh water.

The speaker then made a strong appeal to farmers to produce as much wheat as possible during the coming season. This would not only be to the advantage of the individual, but to the community as a whole, as there was every indication that wheat would be required. It was their duty to crop as large an area as possible.

VOTE OF THANKS.

Mr. I. Jenkins (Murray Bridge) proposed, and Mr. A. E. Ross (Waikerie) seconded a vote of thanks to the Minister. Both speakers referred to the able and enthusiastic manner in which the Minister had performed the arduous duties of his office. "The wheat scheme, which has been adversely criticised," said Mr. Ross, "was the only thing the Government could have done under the circumstances. The Minister has expressed the hope that no farmer will be so unpatriotic as to fulfil the threats made by some that they will not sow so much wheat this year because of the fear of low prices. The strongest pro-German, who puts in all the crop he can, is a better Australian than the flag-wagging jingo who 'goes on strike' in so far as cropping his land is concerned." The remarks of the speaker met with hearty applause, and the vote was carried with acclamation.

The Minister's address was followed by a paper by Mr. F. H. Basey (Renmark) on "The Future of Irrigation on the Murray."

On Thursday morning the Conference was continued, proceedings opening with an address by the Dairy Expert (Mr. P. H. Suter), which was followed with papers by the Wool Instructor (Mr. Henshaw Jackson) on "Sheep on Small Areas;" by Mr. G. Lane (Murray Bridge), on "Dairying;" by the Director of Irrigation (Mr. S. McIntosh), on "Co-operation;" and by Mr. A. E. Ross on "Marketing of Fruit."

The evening session was taken up by the Director of Agriculture (Professor Arthur J. Perkins), who dealt with "Salts Injurious to Vegetation, and their Relationship to the Irrigation of Arid and Semiarid Regions."

NURSERY FOR PHYLLOXERA-RESISTANT STOCKS.

It was decided that the motion standing in the name of the Renmark Branch in regard to the establishment of a nursery for phylloxeraresistant stocks, should not be gone on with, on account of the lateness of the hour, and Mr. H. S. Taylor undertook to prepare a paper on the proposal, to be submitted to the Director of Agriculture, and published with the Director's comments, in the Journal of Agriculture.

NEXT CONFERENCE.

It was decided that the next Conference should be held at Waikerie.

AN INTERSTATE VISITOR.

At the afternoon session of the Conference the Minister of Agriculture for New South Wales (Mr. W. G. Graham) was introduced to the gathering by the Chairman (Mr. E. Nelson).

The visitor, who was received with hearty applause, stated that his visit had extended over the three States, with the object of inspecting the irrigation schemes. After going through the settlements he felt that pride of place should be given to Berri. That settlement had a great future, and great progress had been made there, and also at Waikerie, in a very short time. That was the best illustration he had seen of intense culture in Australia.

The control of irrigation matters in New South Wales, he said, was vested in three Commissioners, with the Minister of Irrigation as Chairman. Settlers on the areas in that State were now on the way to make great successes on their blocks; the Government has lately greatly eased the conditions under which the settlers took up their land. The great problem was to finance the irrigationist during the first few years of his occupancy.

In South Australia they had done more real work in the interests of irrigation than in any of the other States. The land in South Australia was much better in many cases than that with which the eastern States were dealing. They had only one portion in the whole of the New South Wales settlements that would compare with the Perri country.

He expressed the hope that the irrigationists of South Australia would go on in the progressive way that they were now following.

The Conference was brought to a close with votes of thanks to the visiting delegates, officers of the department, the Chairman (Mr. E. Nelson), the Hon. Secretary (Mr. A. R. Hilton), and the Press, after which the gathering joined in singing the National Anthem.

[The papers read at the Conference will be published in the *Journal* of Agriculture as opportunity offers.—Ep.]

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report	Dates of Meetings.		Branch.	Report	Dates of Meetings.	
MATERIAL PROPERTY OF THE PROPE	Page	June. July.			Page	June.	July
Amyton	*		_	Gawler River	*		
Angaston	*			Georgetown	†		
Appıla-Yarrowie	*	_	_	Geranium	1006	24	29
Arden Vale & Wyacca	*		_	Gladstone			20
Arthurton	*			Glencoe	1 *		
Balaklava	1000	10	8	Glencope	*		
Beaufort	₩-	_	_	Goode	+		
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ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings—
June 14th and July 12th, 1916.

EDITORIAL NOTE.

[Owing to extraordinary pressure on space, and the large number of instructive papers being contributed by members of the Agricultural Bureau, it has been found necessary to reduce these considerably for publication; hence, in many It has also been decided instances, a short resume only has been published. that, in ordinary circumstances, it will not be practicable to publish at length papers dealing with the bulk handling of wheat .- Ed. 1

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT. (PETERSBURG AND NORTHWARD.)

MOUNT REMARKABLE. April 5th.—Present: 11 members.

Mr. N. S. Giles contributed a paper in which he gave details of the cultivation and treatment of several varieties of wheat. Yandilla King, Federation, Cumberland, Bunyip, Marshall's No. 3, and Lotts were sown, on varying acreages and at Of the varieties used Bunyip appeared to have given the best different times. results, and he expressed his intention to sow a much larger area with this variety this year. Federation also yielded well, and he thought Comeback was worth persevering with.

> MOUNT REMARKABLE (Average annual rainfall, 23.04in.). May 10th.—Present: nine members and one visitor.

In a paper entitled "General Hints on Live Stock in Relation to the Farm and Stud," Mr. J. McIntosh suggested that the Government should form small studs of the different classes of stock in various centres. That, he thought, would be a means of encouraging farmers to keep better animals if they could secure breeding stock at reasonable prices. The use of the binder and header would become more popular, he thought, and then farmers would be in a position to utilise the stubbles for sheep feed. He also suggested the erection of a weighbridge at the saleyards. which would enable vendors and purchasers to ascertain the exact weight of live stock.

MORCHARD (Average annual rainfall, 11in, to 12in.).

April 15th.—Present: 10 members and two visitors.

Pickling Seed Wheat.—In a paper on this subject the Chairman (Mr. B. S. McCallum) said that if seed were sown in damp soil there was more likelihood of smut developing. The solution used for pickling should consist of 1lb. bluestone in 10galls. water, and every grain should be thoroughly wetted with that. He preferred the floor method. The paper was discussed at length. Mr. Reichstein said every grain should be thoroughly wetted with the solution, and that could only be done by stirring the grain with a shovel. Generally it was agreed that a 1 per cent. solution of bluestone was satisfactory.

WILLOWIE (Average annual rainfall, 11.90in.).
February 15th.—Present: nine members and two visitors.
FODDER CONSERVATION.—Mr. S. J. McCallum contributed a paper in which he urged farmers to utilise portion of the time between harvest and seed time, in

storing fodder to act as a reserve against possible shortages. Straw would be found of great benefit in this connection, and if carefully stacked and protected, would last for years, and in fact its feeding value improved with age. The straw should not be left lying in the fields, as a fall of rain would depreciate its value. He mentioned that he maintained seven head of cattle from the beginning of October, 1914, until the breaking of the drought, with no other feed than straw which came off chaff heaps. Mr. B. E. Schmidt mentioned that it was a good plan to carry out some of the summer cultivation in readiness for fallowing during the period between harvest and seeding.

WEPOWIE, April 18th.—Papers were read by Mr. J. Burns on "Sheep and Wool for the Farmer," and Mr. C. Halliday on "The Agricultural Bureau,"

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

CRYSTAL BROOK (Average annual rainfall, 15.62in.).
April 15th.—Present: 24 members and one visitor.

QUESTION Box.—The meeting was devoted to the consideration of various questions. It was agreed that potatoes could only be grown in well chosen spots on the farm, at a small profit. Oats for hay should be sown early, even if in dry land. The pure Merino was thought the best sheep for the farm where wool and the destruction of weeds were the chief objectives, but if sufficient food for fat lambs could be grown, the Lincoln-Merino ewe and Border Leicester, or Shropshire ram would be found more profitable.

YONGALA VALE (Average annual rainfall, 13in. to 14in.).
April 15th.—Present: 10 members.

AGRICULTURAL EDUCATION.—Dealing with the question of the education of boys who were to take their place as farmers, the Chairman (Mr. A. R. M. Nancarrow) in a paper, said:--"A very important question for the farmer to consider is 'What can I do to best prepare my boy for the occupation intended for him to follow? What education is necessary, and how am I to see that he receives it?' This, of course will depend largely on the situation of the farm, and also on the means at the disposal of the farmer. Many have the very erroneous idea that if their boy can read and write and add up a few figures he has received all the education that is I consider that a person who intends to follow this occupation needs a necessarv. good education, and one that should not end on the day he leaves the primary Though he may be in possession of the fifth class certificate his education should, instead of ending, have only just begun. How often we hear a father say, 'I had only a couple of years of school, and have been fairly successful, why shouldn't two or three years be sufficient for the boy?' We might say in answer to that, the old-fashioned seed-sower served well 30 years ago, why shouldn't it The interests of the farmer are many-sided. do to-day? His main interest is centred on the growing of wheat, while lesser interests are attached to the breeding of horses, his sheep, to dairying, the raising of pigs, his poultry, bees, &c., also his garden and fodder plots. And so I contend that to be fitted for what is to be his life's work, and a busy and important one at that, the young farmer should be placed in a position to learn something about such subjects as veterinary work, sheep and wool classing, the cultivation of fodder plots, the rearing, &c., of the pig, curing of bacon, erection of buildings; he should have a knowledge of machinery, and also bookkeeping. Of course, he will gain a large amount of information from practical experience, but how expensive this often proves to be, and how much better this experience would be with a good foundation beneath it-one which could be secured by, say, a course at the Agricultural College, where a variety of subjects such as agriculture, viticulture, dairying, veterinary science, bookkeeping, wool-classing, carpentry, and blacksmithing may be studied. As the fees for admission are extremely low it is surprising that such a small number take advantage of it. I consider the education the boy receives by his association with the other students alone is well worth the amount that has to be paid in fees, besides the benefit he derives in the theory and practice of the different subjects taught."

CRYSTAL BROOK, May 20th.—Life membership certificates were presented to

Messrs. W. J. Venning and B. Flavel.

NORTH BOOBOROWIE, May 12th.—A lengthy paper dealing with "Smut, Rust, Takeall, and Ergot" was contributed by Mr. W. C. Catt.

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT)

BALAKLAVA (Average annual rainfall, 16.03in.). April 8th .- Present: nine members and visitors.

BULK HANDLING OF WHEAT .- A lengthy paper on this subject was contributed by Mr. W. J. Gleeson, in which he referred to various data and conclusions published in the report prepared by representatives of Messrs. Metcalf & Co., Ltd. An interesting discussion followed in which varying opinions on different aspects of the subject were expressed, the speakers being Messrs. Twartz, Uppill, Butler, Spillane, and P. H. Roediger (Chairman).

NORTHFIELD (Average annual rainfall, 19in.). May 2nd.—Present: nine members.

ROTATION OF CROPS.—Mr. J. Williams contributed a paper on this subject. high land values which prevailed in the district, he said, made it unprofitable to allow the land to remain idle for a season. There were seasons in which a heavy rainfall had been experienced when summer crops could be grown on the plains, but with a dry season following the winter crop would suffer. Further, their choice of summer crops was restricted to maize, sorghum, and Japanese millet. Therefore he doubted whether these were to be recommended. He recommended the following rotation:—First year, fallow; second year, wheat; third year, oats (or second year oats, and third year wheat); fourth year, peas or clover or turnips. That would enable the landholder to carry a larger number of stock than would be the ease if he practised fallow, wheat, and grazing. Mr. R. J. Lambert mentioned that he had seen a good crop of wheat on land which had carried melons immediately before. These had been crushed with the roller and ploughed in. Mr. W. J. Dall did not approve of maize growing on account of the subsequent trouble in working up the land. In reply to criticism Mr. Williams said barley was the best winter growing fodder crop.

> WATERVALE (Average annual rainfall, 27.17in.). May 22nd.—Present: 10 members.

Honey .- Mr. Pope mentioned that the prospects of increased supplies in the immediate future were not bright, as many of the blue gums were blooming out of

MANURE.-Mr. A. S. Burgess preferred bone super, for manuring orchards and vineyards. Members generally considered that the manure should be placed 2ft. away from the trunks of vines and trees, and that it should be ploughed under in preference to being drilled in.

MALLALA, May 9th.-Reports on the last harvest were given by Messrs. J. Nairn, A. Marshman, Curnew, Konzag, Catt, J. A. Arnold, Oliver, A. E. Temby, and A. V. Nairn.

WATERVALE, April 29th .- Discussion took place on the respective merits of different breeds of poultry. The inferior keeping quality of apples, particularly Cleopatras, this year was referred to.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BRENTWOOD.

April 13th.—Present: nine members and three visitors. CULTIVATION SUITABLE FOR BRENTWOOD DISTRICT .- In a paper under this title Mr. J. J. Honner made a strong appeal for the more careful and judicious working

Whilst it was quite legitimate for the farmer to make mistakes, he said, he could not understand a man making the same mistakes year after year, which was what many farmers were doing. He was an ardent supporter of shallow Continuing, the paper read:- 'I advocate fallowing during the months of June, July, and August-June-July preferred-plough from 2in. to 3in. deep. Cut each furrow clean. Better pay the blacksmith a little than strain and pull the plough to pieces trying to plough with blunt, turned-up shares, and pull up stones, and kill the horses in the bargain. Keep at least two sets of shares, and thus have one set always fit and ready, while the other is being set or attended to. Map out your work. The plough I recommend for this district is a 10-furrow to 12-furrow, with a 6in. cut, according to the nature of the land to be farmed and the strength of the farmer's team. This plough will fallow, and will also do to skim back, thus minimising the cost of implements considerably. Land ploughed for fallow should not, unless on account of climatic conditions, remain unharrowed for The heavy fixed plain harrows are to be rea greater period than a fortnight. commended other than where land is too stony or rough. The land so ploughed should get two strokes of harrows at least, and it can then be safely left to sheep (store sheep preferably) to deal with weeds until September or October, according to the season, when it should again be ploughed or skimmed back to a depth just sufficient to kill the weeds thereon. Fallow again by harrowing down thoroughly, and during the summer months the sheep should be allowed to run over This land could be harrowed again after rain and pick off all weeds that appear. (not while wet, because of the tendency to set) but if done while the soil is nice and damp, it has a very beneficial effect at all times of the year. In fact fallow cannot be harrowed too often under those conditions. A hoe drill is to be recommended other than where rubbish, roots, &c., make the use of this impossible. Have the surface for the drill perfectly level, to get a uniform depth for the seed of not more than 2in. When I recommend a 10-furrow to 12-furrow, 6in. cut plough, I intend this plough to work stubble land, chiefly, because I am a great believer in stubble fallow, and contend that even if a farmer has to accept three or four bushels less per acre, the advantages that lie in other ways more than repay him. In support of my contention I will cite a few advantages. Take the lightness of draught in working most stubble land as against land laid down for years, especially during dry seasons, when it is so difficult, in fact, almost impossible, to work ally during dry seasons, when it is so difficult, in fact, almost impossible, to work some land down fine enough to make weeds grow or get a decent seed bed. Again, how easy it is to get a fine mulch on the soil when stubble fallowed, especially if some can be summer ploughed after the stubble is burnt. This all tends to make weeds spring up quickly, and thus presents an opportunity of eradicating them, so different from the cloddy, laid down land fallow. In fact, stubble fallowing is the only way some land can be cleaned of weeds. The man with 600 acres who goes in for stubble fallow can crop about as much land as the man with 1,200 acres Some will argue that stubble fallow means impoverished on the other system. land, but with judicious changing of crops I believe the more often we farm our land generally, with the judicious application of phosphates, the richer and more valuable that land will become."

BRENTWOOD.

May 18th.—Present: 14 members and four visitors.

SEEDING.—In a paper on this subject Mr. C. Newbold said it was a good plan to endeavor to get barley drilled in on stubble ground before rain. If it became too rank it could be fed off. Before sowing the wheat crop, the harrows for preference, or the cultivator should precede the drill. From 90lbs. to lewt. of super. should be applied per acre. Seed should always be thoroughly cleaned, and pickled in a bluestone solution. With such wheats as Marshall's No. 3, Yandilla King, and Silver King, at least 70lbs. to 75lbs. should be sown per acre, and of early wheats such as Triumph, Red Russian, and King's Early, 80lbs. to 90lbs. A lengthy discussion followed in which various methods of pickling were described. The Hon. Secretary (Mr. G. L. Tucker) thought 60lbs. of graded seed wheat per acre quite sufficient. In reply to questions, Mr. Newbold said his practice was to sow, say 10 acres with carefully selected and pickled seed, and the crop from that was used for seed for the following year. It was sown unpickled, unless very wet conditions prevailed at seeding time.

PINE FOREST, May 16th.—A paper dealing with growing seed wheat was contributed by Mr. S. Barr.

WESTERN DISTRICT.

KOPPIO (Average annual rainfall, 22.40in.). May 16th.—Present: nine members.

Rabbit Trapping.—Mr. R. Schultze read a paper on this subject. During the winter months, he said, the rabbits lived mostly in deep warrens, to dig out these being an expensive undertaking. He suggested the use of wire netting traps, about 2ft. 9in. long, and from 6in. to 10in. in diameter, with a swing door. These should be firmly imbedded into the mouth of the warrens, and banked up with earth. In addition, spring traps could be used on feeding grounds, &c., but it was unwise to use these in the burrows. Members generally agreed that netting traps were effective for catching rabbits in deep warrens.

ROBERTS AND VERRAN.

April 10th.

CARE OF FARM MACHINERY.—The following paper was contributed by the Chairman (Mr. A. T. Cowley):—'The Agricultural Bureau has gathered sufficient evidence to satisfy all concerned that in following the pursuit of farming, up-to-date methods are the best paying, if not, indeed, the only paying methods. Up-to-date methods call for the outlay of a large amount of capital in machinery and implements. In fact, however much money one may have expended upon his plant, there always seems to be an opening for something fresh as soon as money can be found The man who can afford to keep his plant up-to-date is the one who to buy it. has the best chance of success, other conditions being equal. The farmer whose capital permits him starting well equipped with machinery has an advantage over one who cannot afford a complete plant, but the advantage does not necessarily continue throughout the whole career of a farmer. All machinery is subject to breakage and wear. The man who does not recognise and face this fact will find that very soon, instead of being able to increase and improve his working plant, he has to put all his cash into repairs and the replacements of his original imple-Every practical farmer must realise that it does not pay him to invest in any machine unless he can make it pay more than interest on the cost, and earn besides sufficient to buy another similar or improved machine before it is worn out. Having accomplished this much within the "life" of the machine, every year's service he can get out of it after that means so much clear profit. A farmer should keep credit and debit accounts for every machine he owns. This may appear at first glance impracticable, but it is not so. For instance, what is the ploughing of a piece of land worth? The value of the ploughman's time, the feed for his team, and the wear and tear upon the plough and team. The plough must be credited with its share of the value of the work. It must cover an area large enough to pay for itself with interest, as well as paying for its own repairs as it goes along to be a profitable plough to the owner. If by extra care and attention If by extra care and attention the owner can now have a good plough, which owes him nothing, to continue working for him at no more cost than its incidental upkeep, he receives his reward for the moments he has habitually spent daily in tightening up loose nuts, oiling, and when necessary, washering wheels, and the score of other little attentions which a man who loves a good plough can pay it. As with the plough, so with all implements and machinery, and especially the more complicated machines, it is care that gains the profit of long service. Oil and grease should be applied regularly as required to all working parts. A machine may be smothered in oil and have the grease dripping off it, and yet have bearings cutting out for want of oil. It is not necessary to pour large quantities of oil all over the machine, but it is necessary to see that every working part is receiving just as much lubricant as it requires-more than it requires is waste-less means destruction. In machinery all spindles should be kept running true and without vibration, and their bearings kept snugly fitted and clean, and supplied with a regular flow of good oil. All gearing should be well Pinions should be kept in perfect alignment, and should ensupplied with grease. gage to practically the full depth of the cogs. Pitch chains also should be oiled at the joints, should never be actually tight, yet should not be slack enough to flap about or to render jumping off the sprockets possible. The sprockets should be kept true in line with the chain's course. All these points not only save wear on the parts mentioned, but save strain upon the whole machine, and make work easier for man and team. All bolts in any machine or implement should be examined occasionally and tightened whenever looseness can be detected. Where

joints are composed of wood and iron there is always likely to be some shrinkage in the wood, leaving the joint loose if the bolts be not tightened. Where joints are composed entirely of iron or steel looseness is liable to be caused through jarring or vibration gradually shaking the nuts loose, or the bolts may be stretched by strain. A bolt that has formed a habit of becoming loose in any particular place should be discarded in favor of a new bolt. The old bolt need not be thrown away, but can be used in a place where the nut does not have to hold at exactly the same place in the thread. In a plough frame for instance a nut that has "come loose, two or three times will never stay tight again, and much time and trouble may be saved by recognising this fact early. Every bolt in a machine is there to hold something, and every one that is missing or loose throws an extra strain, not only upon other bolts if there are others in the same joint, but upon other parts of the machine, and this is often a cause of a breakage occurring. The maker's ideal is to give each part of the machine the correct proportion of strength, but if the strain which should be borne by a loose joint is thrown upon another part it is unfair to the machine or to its maker to work it so, and, generally, expensive to the owner. All machinery liable to damage by sun and rain should be kept under Most machinery does not lend itself readily to covering cover when not in use. when standing in the field, but often a cornsack or two thrown over the more delicate parts at night will help to lengthen their time of service. An old cornsack used to cover a binder knotter will keep it from becoming rusty. Reaper helts can be covered by the same means during a spell of wet weather. One thing we cannot be accused of wasting upon our machinery is paint. It preserves wood from decay, or iron from rust, and I believe it would be a paying proposition to It preserves wood always keep a coat of it upon all iron or wood work in our machinery and imple-I have not dealt with the working of each several machine or implement in common use. They are numerous, and diverse in character. Whatever be their nature or the work required of them they require attention to secure for them smoothness of running and minimum of strain while working, and protection from weather destruction when idle—not only weather destruction, though, for a more destructive element is frequently to be found in an owner's laziness or thought-Spring-pressure implements are left standing with pressure applied for weeks or even months. Binder canvases are left tight, and belts left "on" overnight; seeddrills left clogged with super., and various other things neglected, all of which ensure some measure of destruction.'' An interesting discussion followed.

ROBERTS AND VERRAN.

May 16th.—Present: six members and one visitor.

Preparations for Seeding.—Dealing with this subject in a paper Mr. L. Cowley emphasized the need for having the land, machinery, and seed in readiness to commence seeding immediately the season broke. The man who waited until that time, and then commenced to get ready was at a heavy disadvantage, he pointed out. The selection of the seed was of the utmost importance, and he had found it a good practice to keep a greater quantity of each of early, mid-season, and late wheats than he expected to sow, as the season itself would be a determining factor in regard to the quantity of each that could be most economically put in. Mr. A. T. Cowley agreed with the writer of the paper that it was advisable to get all rubbish off the land before seeding. Mr. F. Masters thought dead bushes an advantage on the land, as they sheltered the young plants, and were valuable when the stubble was being burnt.

WARROW. May 20th.

Early Sowing Oats and Wheat.—In a paper on this subject Mr. F. S. Mitchell suggested the following seeding practice for a farm with 500 acres fallow and 200 acres stubble; one-half the area being sown to oats, and the other half to wheat. Starting with a 13-tine or 15-tine cultivator the second week in March, he could, with a 15-disk drill, finish sowing oats by the third week in April; immediately starting with wheat, he could complete the seeding by the middle of June, thus leaving ample time for fallowing. Oats sown early before rain could be distributed at the rate of 14bush. seed, with 80lbs, super. per acre; later, and after rain, 14bush, with 100lbs, super. His experience was that the earlier sowing yielded the better

erop. Oats constituted the best crop to sow on new land, on account of their yielding a better stubble than wheat. Stubble should be sown to that crop also, fallow being preferable for wheat.

YABMANA (Average annual rainfall, 15.14in.). March 18th.—Present: eight members and four visitors.

Noxious Weeds.—Following the reading of a paper, a lengthy discussion took place. Dandelion, which was a trouble to some, could be kept under by careful cultivation, Mr. G. Dorey said. Some considered this plant made excellent stock feed, but it was difficult to contend with at seeding time. Mr. L. Crittenden thought it practically impossible to clear out the iceplant, and it was ruining large areas of country. Mr. J. Robertson said that contrary to expectations it had spread considerably in the hills. The best method of handling the pest was to dig the plants and burn them. The Chairman said the iceplant did not thrive on the hard red soil. Star thistles should be destroyed before the plants seeded. Charlock, mustard, and stinkwort were beginning to be troublesome. The Hon. Secretary (Mr. H. P. McCallum) thought the best means of combating these troublesome weeds was to keep the land in fine tilth and give the weeds sufficient time to germinate before cultivating for seeding.

YADNARIE (Average annual rainfall, 14.09in.). April 15th.—Present: 12 members.

Success in Farming.—In a paper on this subject Mr. J. W. Darley expressed the opinion that the success which attended the efforts of the farmer largely depended on the man himself, and the methods he adopted. An important matter was that of fallowing. "Care should be taken not to plough in quantities of straw or any dry regetable matter unless in a very wet district, as this is one of the most fruitful causes of takeall," the paper read. "Fallowing should commence as soon after seeding as possible, and should be ploughed to a depth of 4in. to 5in. in heavy land such as this district, and from 3in. to 4in. in lighter land. As soon as the fallowing is finished it should be harrowed down, preferably across the plough work, as by doing this it remedies any unevenness left by the plough. Keep all weeds in subjection as soon as they appear, with the aid of a cultivator or some other implement that will suit the requirements of the case. A few sheep given a run over the fallow occasionally will prevent any weeds seeding. If the season should open dry it is advisable not to rush in and sow all the crop, but to wait. Have all stumps and stones picked, and have everything possible done so that when the rain does come there will be no delay, and one may concentrate all one's effort in getting the seed If the land is dry a great number of weeds will come up which cannot afterward be killed, and so they absorb the moisture. The best wheats must be grown. For hay purposes we cannot do better than sow Marshall's No. 3, Walker's Wonder, or King's Early. Opinions differ as to the best wheat for grain. I favor Marshall's Hybrid. It is a wheat that will suit nearly any disgrain. I favor Marshall's Hybrid. It is a wheat that will sunt trict. However, I do not advocate the sowing of one variety only. Every farmer should raise his own horses, and in selecting a horse to mate with his mares care should be taken to choose the best, as it costs no more to keep a good foal than a My fancy horse is the Suffolk and Clydesdale cross, as it makes good active farm horses with plenty of weight. Sheep are an immense benefit to the farmer; they help keep the fallow clean as well as providing supplies of meat. For lamb raising I prefer the Merino, and they are not very difficult to keep inside the Two or three cows are sufficient where sheep are kept, but, of course it depends on the extent of the farm. Pigs are well worth the trouble of raising at the present time, but always keep the best. The same applies to fowls.

YANINEE.

April 15th.—Present: nine members and two visitors.

SEEDING.—This subject was dealt with in a paper by Mr. J. Lund, in which he stated that sowing could extend from the middle of April to the middle of June in this district. It was advisable to sow pickled graded seed to a depth of 1½in. to 2in. when the land was dry, and to a slightly less depth when seeding with rain. Several questions were asked by members, and replied to by the writer of the paper.

YEELANNA.

April 22nd.—Present: 12 members.

QUESTION BOX.—Various questions were discussed. Mr. Glover thought the cheapest fence for mallee country could be made with one mallee post at each chain, with three iron posts between; either six wires or three wires and netting being used. Generally members advised sowing 3 bush. of seed wheat per acre; Mr. Wemyss recommended 60lbs. April and May were considered the best months for sowing.

MILTALIE, May 19th.—A paper dealing with the bulk handling of wheat was contributed by Mr. J. S. Jacobs, and an animated discussion followed.

SALT CREEK, May 20th.—Mr. B. Braunach contributed a paper on the bulk handling of wheat, and members afterwards discussed the questions raised at length.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES)

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

April 17th.—Present: six members and one visitor.

SEEDING.—In a short paper Mr. S. Hill said that after fallow was cleared of shoots, stumps, &c., it should be in good heart for drilling. He advised sowing as large an area as possible in time to catch the first rains. Stubble should have a good burn over it, and if it were not in suitable condition for seeding, it should be cultivated. Stubble land that last year carried a crcp affected with takeall should this year be sown with 40lbs. oats and 50lbs. of super. per acre. Land not so affected could be sown with 45lbs. wheat, and from 50lbs. to 60lbs. of super. per acre. He recommended harrowing after the drill. Members thought it advisable to wait for rain before cultivating, to eradicate weeds, and advised cropping land infected with takeall with oats for two seasons before sowing wheat again.

CLAYPAN BORE.

May 15th.—Present: eight members.

Care of Harness.—Mr. C. Hill, in a paper under this heading, advised purchasers to secure the best harness, protect it from the weather, and dress it with neatsfoot oil three or four times each year. Before the oil was applied sweat should be removed with the aid of soap and warm water, but it should on no account be soaked in boiling water. Harness should not be hung in the stalls alongside the horses; and where necessary a room should be set apart specially for it. Collars could be hung on 3in. x 3in. x 2ft. 6in. pegs, each of which would take three. The pipe collar with brazen hames, well-fitting, was advised, and copper rivets should always be on hand to repair possible breakages. Mr. Dunstan preferred a peg for each collar, and thought mutton fat better than oil. Mr. E. Colwill used mutton fat, neatsfoot oil, and a little kerosine. Mr. J. Gray advised marking each collar with the name of the horse.

COOMANDOOK (Average annual rainfall, 18.01in.). April 22nd.—Present: 10 members.

Takeall.—Dealing with this subject in a paper Mr. O. Blucher, after describing the effect of the fungus on the wheat plant, suggested preventive means as follows:—Shallow ploughing (say not less than 3in.) should be practised, and excessive quantities of rubbish should not be ploughed in, especially if fallowing late, as this prevented the ground setting properly. Dry working should be avoided. The disease was partial to loose soil. A paddock with a crop showing signs of infection should either be sown to oats, or be burnt or fireraked, then fallowed as early as possible, not too deep, when the ground was wet, and subsequent weed growth, especially barley and spear grass, rigidly suppressed. Frequent workings during the winter, to secure a solid seed bed, were advised; for preference the tine cultivator, followed a few days later with the harrows, being used. As it was difficult to get a firm seed bed in sandy land, this should be worked as shallow as possible, and every third crop should be oats.

COONALPYN (Average annual rainfall, 17.49in.).

May 12th.—Present: 10 members and one visitor.

POULTRY.—In a short paper Mr. E. J. Hopcraft advised farmers who desired to adopt poultry keeping as a profitable sideline to procure a dozen pure-bred two-year-old White Leghorn hens, and place a cockerel of the same breed with them from July until the end of October. Table birds could be bred all the year round, as there was always a good market. The best general purpose breeds were Silver and White Wyandottes and Black Orpingtons. Mr. Whitehead thought the Orpington and other heavy breeds would stand the cold weather of the district better than the White Leghorns. Mr. Venning preferred to procure sittings of eggs instead of purchasing the birds.

GERANIUM (Average annual rainfall, 16in. to 17in.).

April 22nd.—Present: nine members and one visitor.

THE CULTIVATION OF GRASSES.—Mr. F. Norton contributed a paper. of the soil in the district, and the ease with which it could be worked, as well as its capacity for retaining moisture, he said, were favorable to the growth of grasses. It would be unwise to attempt their cultivation until the land had been cleared of stumps and bushes by the growth of crops, especially oats, and the practice of fallowing and grazing sheep would sweeten the soil, and one could commence in a small way, and gradually increase the area sown, as experience directed. (irrigated) had proved itself, or it could be mixed with super. and distributed at the rate of 11b. or 21bs. per acre with the grain crop. If left for a year to establish itself, subsequent cultivation of the land would not detrimentally affect it. Berseem was a quick grower under irrigation, and it provided fine winter feed. King's Island melilot could be profitably sown with manure when drilling wheat, and like lucerne, would improve the land for succeeding wheat crops. Of other grasses which he thought likely to be a success, he mentioned the following:—
Rhodes grass is, on the whole, a hardy plant, although likely to be cut back by a heavy frost. But it comes again quickly, propagates itself extensively by rooting at the joints of each runner, and gives a lot of feed and is a perennial; stock do well on it. Italian rye grass is also a perennial, quick, easy grower, stools well into bunches, stock relish it, and it is one of the most useful all round grasses for both sheep and cattle. Evening primrose bunches, but runs up to a fair height. When in flower it creates a fine perfume; stock do fairly well on it. Oryzopsus is a very hardy, coarse grass, grows bunchy and to a good height; starts with very little tilth or moisture, and once it takes hold, and is allowed to seed, it will propagate itself and makes very good hay, and is well worth trying. Phalaris, or canary grass, is a useful fodder; runs up to the height of wheat, will make a good heavy cut of hay, and if left will bunch out more each year; an easy, hardy grower, and well worth growing. I prefer autumn to spring sowing for lucerne, They get a better root going through the winter, berseem, and the grasses named. therefore stand the summer better than if sown in the spring, and are more likely to escape frosts at their initial stages. The essentials to success are a good seed bed, a fine tilth finished with rolling down after sowing, which firms the soil round the seed. This starts them more quickly, and they root better. is a very important matter. Well rotted farmyard manure, or failing that bonedust or bone super. or bone and super. on the land intended to be sown. the best time to sow; if sown earlier there may be rain to start the seed, and then a dry spell. If sown too late the ground will have become colder. Rape, kale, Rape, kale, mustard, unlike grasses, will stand rougher treatment, and are annuals. They do well with reasonable treatment. A cheap, quick method of producing them is to mix the seed with super. and drill in lightly on the stubble, and harrow in. These are better sown in autumn, but can be sown in the spring, but one has in the latter ease to depend too much on summer rains. Japanese millet, early Amber cane and maize are useful summer fodders, and with fair rains will do well in this coun-Sow them on fallow if possible." The writer of the paper advised the manufacture of ensilage for use during a period of shortage. Mr. Perrin favored sowing lucerne in the spring. He found that stock would not eat evening primrose grown in that district.

LAMEROO (Average annual rainfall, 16.55in.).
April 15th.—Present: 18 members.

SEEDING PREPARATIONS.—The Hon. Secretary (Mr. E. T. Wray), in a paper referred to the necessity for making early provision for seeding time. He found it wise to stable feed horses at that time of the year, as any delay through their becoming poor or sanded, would outweigh the cost of the feed. The selection and care of the seed was of the utmost importance. Barley should be cleaned from wheat or oats, and a bluestone pickle should be used on the wheat seed. Mr. A. J. A. Koch did not object to the presence of barley in seed oats. The Chairman (Mr. C. R. Eime) agreed. Other members also took part in the discussion.

MANTUNG. April 13th.

SEEDING.—Mr. E. Hannaford contributed a paper on this subject. He advised ploughing to a depth of 3in. or 4in., and 80 to 100 acres sown early would provide early feed for the stock, and generally yield a good cut of hay. Clean seed should be sown after being well pickled in a bluestone solution. Federation, Silver Baart, Gluyas, and Yandilla King should be sown at the rate of about 45lbs. per acre; Le Huguenot 1bush. per acre, and Dart's Imperial 50lbs. Super. could be applied at the rate of 45lbs. per acre. Sufficient oats should be grown to be used with cocky chaff for horse feed. In reply to questions the writer of the paper advised drilling to a depth of 2in. in heavy land, and 3in. in sand. He had found a solution of 20ozs, of bluestone in 10galls, water a satisfactory pickle. Mr. Lehmann advised drilling to a depth of 1in.

MINDARIE.

May 1st.—Present: nine members and one visitor.

SEEDING OPERATIONS.—Mr. W. P. McCabe, in a paper on this subject, said best results were to be obtained by using a light plough to a depth of not more than 21 in. He preferred a large drill, viz., up to 18 or 20 disks. All farmers should pickle their wheat as a preventive against smut, he said, using a solution of about 11b. of bluestone to eight gallons of water. A tine cultivator was suitable for working new mallee land, as it pulled out fibrous roots. He recommended just covering the seed with earth. Burnt country, he thought, should be either fallowed or sown with oats the first year. Considerable discussion took place. Mr. Payne recommended shallow ploughing, not more than 2in. or 2½in., but would not use a large drill, as it would sag in the middle after being in use a little while. He preferred cropping the land with oats, in place of fallowing after wheat, and then follow oats with fallow. Half a bushel of wheat per acre would be found sufficient, and he had had good results from pickling with formalin. He recommended sowing 45lbs. to 50lbs. of early wheats to the acre. Mr. Johnston advocated fallowing in preference to sowing with oats the third year. On burnt mallee country he would sow oats for a first crop, as he thought there would be more chance of a stubble burn, and thereby killing off the shoots. Mr. Lowe preferred pickling on a floor to using a pickling cask. He would work the drill in the same direction as the cultivating, and sow no more than 30lbs. of seed to the acre. The majority of the members favored using 60lbs, or 70lbs, of super, to the acre.

MYPOLONGA.

April 19th.—Present: 19 members and 14 visitors.

Relative Profitableness of Milkselling as against Creamselling.—A paper prepared by Messrs. Wright, Pickering, and L. Cailis was read by Mr. Pickering. It was pointed out therein that the initial outlay when milkselling was proposed was confined to the purchase of buckets, but when it was proposed to sell cream, in addition it was necessary to secure a separator, cream cans, and pigs to consume the skim milk. In the former case less labor was involved. The price of butter was much too low, relative to the price that could be secured for milk. The value of skim milk as pig feed was generally overrated; to get the best results from its use, not more than 3lbs. should be fed to a growing pig, and as the animal developed, it should be fed with more highly concentrated food pound for pound with skim milk.

A paper prepared by Messrs. H. Hill, H. T. Kleeman, and G. G. Hale, was also read. They took as a working basis a herd of 12 cows, with an average of 400galls. per cow. They concluded that the cream seller, taking into account cream, pigs.

and calves (£2 each at seven to eight weeks) would show on an average a return of 19s. 3d. per cow greater than the milk seller. An enthusiastic discussion followed, and on the question being put to the vote, by a majority of one; members decided that selling milk was more profitable than selling cream.

McNAMARA BORE.

April 2nd.—Present: seven members and four visitors. COLT BREAKING .- The following paper was read by Mr. E. G. Bicknell:- "The easiest way to catch a colt is with the use of a crush pen, but this tends to frighten the animal. I prefer to catch it in the yard; as a rule this is not difficult with a farm-bred animal. I use a halter with a good long rope for this purpose, and after having caught the colt, let him have a good pull round until he finds that he cannot get away. He will soon give in, and there will be little trouble in catching him again. The next step is to teach him to lead. After putting on the halter take a firm hold of the halter rope close up to the head with one hand, stand alongside the colt, and push him steadily from you with the hand on the wither, at the same time pull steadily on the halter rope. This will induce him to take a step forward. He will soon understand what is wanted, and will lead without much trouble. should be taught to back at the same time. The harness required for mouthing is a strong leather headstall with a bit that can be taken off on both sides, a pair of short leather reins, a sureingle with a buckle sewn on each side, and a crupper. Put this on the colt, and leave it on for two or three hours the first day, and leave it on longer the second day. Fasten the reins fairly tightly, and make sure that they pull evenly on both sides of the mouth. To teach the colt to drive, use the same harness as for mouthing, but replace the short reins with a pair of long. Hold the rein nearest you tight, and leave the other loose; make the colt trot round in a circle for a few minutes, then change sides, and send him the other way. When he will do this without trouble try driving him straight ahead, and teach him to answer the rein by pulling one rein to turn him in one direction. Drive a little way and then turn him the other way. The colt should now be quiet enough to put Harness him to a rail that can be drawn easily, but must be heavy enough to keep the swing off his heels if he should start with a jump. increase the weight for him to pull. The colt is now fit to put in the team. first day only leave him in for an hour or so, and gradually lengthen the time till he can stand a day's work. The main things to remember are, never to frighten the celt, see that the harness is in good order and fastened securely so that there is no chance of it working loose, coming unfastened, or breaking, for if the colt once gets away he is always ready to try again. See that the harness does not hurt him. Get the colt to make friends with you. Only use the whip when other measures fail. Take your time to break the colt, for when hurrying you often teach the colt a bad habit which clings to him for life." Mr. Paterson recommended washing the shoulders of the colt immediately after the animal was worked.

PINNAROO (Average annual rainfall, 16.74in.).

May 12th.—Present: 17 members.

Weevil.—A paper on this subject was contributed by Mr. L. J. P. Roper, who outlined the life history of the pest, and pointed out that under favorable conditions the life cycle could be completed within a month. "It has been shown," the paper continued, "that a temperature of 80 degrees is the most suitable or favorable for the development of the beetles. Moisture in the form of a water-vapor is very favorable for these beetles, and a close and confined atmosphere is likely to assist in the breeding and growth of these pests. This is bonne out by the fact that wheat reaped with a harvester early in the season before it is actually hard and ripe, carted to market and stacked, is very susceptible to the invasion of weevil; more especially if there is a considerable quantity of grain stacked, and the air cannot get to the bags. Kept in small corked tubes centaining grain, in a sitting room that had a fire in winter, some of these beetles lived for nearly 14 months. On being touched or shaken they feign death; they lie often for a considerable period refusing to show any signs of life, even when handled, but they may be induced to move by breathing on them. Sunlight will bring them into activity, and bags of wheat taken from the stack apparently showing no signs of weevil, will, if infested, be almost black with the moving mass when left standing out in the sun. The best means for finding them in bags of wheat is to run the tester up along the seam the same as should be done for finding any foreign matter, and

if the bag is badly infested you will see a quantity of flour showing along the seam. Once the pest has got into a sack or shed it takes no end of trouble to get rid of it, and although a number of remedies are prescribed it is hard to say if any of them are absolutely effective. I never put wheat down in the shed without first putting a thick layer of common pickling salt all over the floor. Another remedy used in conjunction with this is to give all crevices and cracks a good saturating with sheep dip, but in spite of all these precautions I was never able to say that we were free from the trouble if the wheat remained in stacks any time. Another practice that is sometimes adopted is to use bi-sulphide of carbon—this is, however, for closed places or small quantities of wheat. The grain to be treated should be put in a bin or airtight compartment or receptacle, and the bi-sulphide of carbon poured into a saucer or shallow vessel and laid on the top of the grain, and then the receptacle The liquid will evaporate, and the fumes being made airtight for 24 or 28 hours. heavier than air, will sink down through the grain and kill all insect life. pound of bi-sulphide is sufficient for 100 bags of wheat. In treating a store or mill the whole place would, of necessity, have to be made airtight. Then another remedy used considerably in wheat sheds is hot lime. After sweeping the board floor and cleaning crevises as well as possible, run hot lime all over it.

ROSY PINE.

May 17th.—Present: 11 members.

CARE OF FARM HORSES .- A paper was contributed by the Hon. Secretary (Mr. A. Carmens) in which he said:—"If a farm is to be worked economically the horses must be kept in good condition, as without condition one cannot get the maximum of work out of them. Of the several factors that contribute to maintain ing condition regularity and sufficiency of feeding are first. My ration for an ordinary working horse is 10lbs. chaff, and about three double handfuls of bran three times a day, and two sheaves of hay last thing at night. If a horse is working hard I feed oats, but ordinarily good bran and chaff is sufficient. Bran assists in maintaining the horse in good health, and prevents his blood becoming overheated, thereby lessening, if not completely eliminating the sore shoulder trouble. If possible I would have the water trough in the horse yard. If a horse knows he can get water at any time he will not be so likely to take an excessive quantity when he comes in hot from the paddock. Horses should be watered before meals. see no great advantage to be derived from tying up horses, providing the manger is large enough for each to have ample room at it. If they are tied up at night I would use a headstall or halter in preference to a neckrope, as then there would be no danger of a horse being strangled. Another point that conduces to the wellbeing of a horse is grooming. However, it is useless to feed and groom a horse well if the team is overloaded. A warm stable assists in maintaining condition at a much lower cost of food than an open yard. Keep a few medicines on hand. I usually give each horse about two packets of Epsom salts per week, and keep rock salt in the manger. All harness should be well fitting. Collars should be stuffed firmly and kept clean. I would sooner have a collar on the tight side than loose. Any sores appearing should be washed with warm water and permanganate of potash, and the collar should be eased with a bag needle so that it does not press on the sore. When starting to work a team at the beginning of the season do not work the animals too heavily for the first few days. I always make a practice of washing their shoulders with salt and water for a few days. This helps to harden them off." Mr. Lee agreed with the writer in general, but said the horse required Mr. Bonnin preferred chaff and Lucerne was a splendid thing for horses. oats with chaff and bran for variety. He was not in favor of washing sore shoulders too frequently, as it formed a thin skin which easily rubbed. He used white lead and neatsfoot oil for sore shoulders. Mr. C. E. A. Schiller believed in changing the feed at times to cocky chaff and crushed wheat or barley, and then long hay. He always tied his horses up, as they were continually fighting when loose. He thought moleskin or leather preferable to collar check. He has four steel collars in use, and found them a splendid thing for horses subject to sore shoulders. Mr. Hill favored giving about 21bs. of oats to each horse.

WOODLEIGH.

May 15th.—Present: nine members and three visitors.

CULTIVATION.—In a short paper Mr. G. Good advised ploughing the red flat land.

of the district with a six or eight-furrow implement, and then picking the stumps.

The harrows should follow, and then the drill, if practicable a 17-hoe or 19-hoe machine. If necessary the harrows should follow the drill before the land became too dry. A vigorous discussion followed.

BORRIKA, April 22nd.—Members discussed the occurrence of smut in wheat crops, and the wisdom of sowing to a greater or lesser depth.

MURRAY BRIDGE, April 18th.—This being the annual meeting of the Branch, the Hon. Secretary delivered a report on the work done during the year.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

March 20th.—Present: 16 members.

BIRD PESTS.—Mr. W. L. Summers read a paper on this topic. Careful inquiries had elicited the information that various methods of poisoning and the use of mechanical scarers had been tried in other States with but little success. mechanical scarers, he said, the kerosine tin windmill, with a stone or marble in it, allowed to run all night was as effective as any. A difficulty, however, was that when there was not a fair wind, the scarer did not operate. In some cases successful protection was claimed against certain classes of birds as a result of hanging on a thin wire stretched above the fences large numbers of narrow strips of different colored rags. He had little faith in any permanent benefit from that, however. In Tasmania lines carrying thin strips of tin were used with more or less effect in protecting cherries. That plan had been adopted here with but partial success in protecting individual trees, the flashing light and jangling tins scaring the birds for a time. He had successfully protected a trellis of grapes against sparrows and greeneyes by throwing white cotton backwards and forwards over the vines. The cotton was practically invisible, and the sparrows in alighting touched the cotton and immediately flew off fearing some trap. With the silver-eye, however, the cotton had no effect. It was quite possible that with more generous use of these means of scaring birds, and by co-operative action in this direction better results might be obtained, but in general experience these mechanical devices lost their efficiency when their novelty was worn off. From the orchardist's point of view it was probable that the various native parrots and the starling were the worst enemies. The latter was always a trcuble, but the former came down at intervals in such numbers that they took a very heavy toll of fruit. and poisoning were about the only methods of dealing with them, and neither could be said to be very effective. By frequent firing of guns it was possible to keep starlings on the move, but the parrots at times would only shift from tree to tree, no matter how frequent the firing, nor did they afford too good a chance of firing into them when leaving a tree, the result being that the exasperated grower often shot into the tree regardless of the damage he did. The use of poison was more effective than any other means, but the greatest care had to be exercised owing to the danger of poisoning human beings or domesticated animals. A wheat poison for destruction of birds and mice may be prepared as follows:-10lbs. of good sound wheat was thoroughly damped with fresh milk so that the whole grain was wet, but not dripping with moisture. Five-sixths of an oz. (avoirdupois) of powdered strychnine, not too fine, was then gradually shaken on to the grain, the whole being kept constantly stirred. When all the strychnine was mixed in, the grain might be immediately laid. This was best done by laying a good train of chaff, without any oats, to attract attention. The poisoned grain was then very lightly sprinkled on the chaff. Caution .- Fruitgrowers and farmers following out this method without assistance are earnestly cautioned to beware of the intensely poisonous nature of strychnine; they were strongly advised to employ for this work none but picked men. Mr. P. H. Williams stated that the silvereye was always busy in the trees when in flower, and when the birds were destroyed and dissected the stomachs were found to contain a great number of aphides.

considered the magpie did a great deal of damage, both by eating fruit and destroying the insect-eating birds as well as fregs and lizards. Mr. G. W. Summers reported that the Blue Mountain parrots were very destructive in his orchard during January, but when the stringy barks began to flower farther back in the ranges the parrots disappeared from the orchard. Mr. E. Ashby thought the evidence for and against the birds should be carefully considered before any particular species was condemned, as in many cases the good they did in destroying harmful insects outweighed the evil. The starling did a great deal of good in damp districts in destroying grubs which attacked the roots of plants, and in parts of the hills they had saved the pea crops by feeding on the cutworms; the fruit was only used for feed when the ground became hard and dry and the birds were then unable to ob-The silvereye did an immense amount of good in destroytain their natural food. ing insect life, feeding almost entirely on insects. At nesting time the birds were very busy searching for food, and the silvereye nested when fruit was searce, hence the food obtained was mainly insect life. The members as a whole very strongly deprecated the poisoning of water as a means of destroying bird pests, because it caused great destruction to the native birds and animals, many of which are very beneficial, as well as other dangers.

BITTER PIT.—Mr. G. W. Summers called attention to the great percentage of bitter pit in this season's apple crop. He stated that fruit borne on laterals were equally pitted with those carried on the leaders, and small as well as large fruit was affected; heavily laden trees also showed a large number of pitted apples. He contended that the great difference between the day and night temperatures and the heavy dews during February had been a factor in encouraging the development of the pit. Mr. Ashby stated that 50 per cent. of his Cleopatra crop was affected.

BLACKWOOD (Average annual rainfall, 27in. to 29in.). April 17th.—Present: 12 members.

Co-operation.—A paper under this title was contributed by Mr. A. A. Magarey, who recommended co-operation on the part of fruitgrowers to reduce the cost of marketing. The fact that co-operative efforts had been tried in the past and failed should not be taken as an indication that a workable scheme could not be evolved: the failures of the past should be guides as to what not to do in the future. He then referred to the action taken by apple growers in Nova Scotia in this connection.

Potatoes.—Mr. J. Turner said the district could produce larger quantities of potatoes than was the case at present. Especially was that so in young orchards, which would benefit from the extra working and manure if good tubers were planted at the correct time. The site selected for growing that crop should be a sheltered one, free from frosts. The land should be reduced to a fine tilth, and if to be hand worked the rows should be 2ft. apart, and the sets 1ft. apart in the rows. If to be worked by team the rows should be 2ft. 6in. apart. Before the potatoes were showing the harrows should be put over the land; that would destroy many of the young weeds and loosen the surface soil. Early planting in that district was not to be recommended as the young plants were liable to be cut down by frost. The crop should be manured liberally, bone super. had given best results. As to varieties to grow, Tasmanian Bismarcks had given good results, but of late years they had been badly affected by Irish blight, and with the wet season last year they had been a failure. Pinkeyes planted at the same time, i.e., in the middle of June, in a more sheltered position had given good returns. It was not advisable to plant in the gullies until September or October, when Up-to-Dates and Carmens would give the best results. These varieties always commanded a higher price than others. The main factor in potato growing was to plant only good reliable seed.

CHERRY GARDENS.

May 19th.—Present: nine members.

CULTIVATING ORCHARD LANDS.—In a short paper Mr. C. Ricks said his practice for years had been to plough orchard land to a depth of not less than 6in. in July, and again in the reverse direction in September to a depth of 4in., and then cultivate once or twice. During the past two seasons he had ploughed the land twice, and not cultivated, and his crop of apples and pears this year was the largest and

best he had secured. If the soil were cultivated down too fine he found that with heavy rains it washed away, and after rain it baked hard; also light rains ran off instead of sinking in. Leaving the land in the rough state obviated these difficulties. Members agreed that to get the best work from the cultivator it was necessary to plough the land first, as no implement was available for working hard soil.

HARTLEY (Average annual rainfall, 15in. to 16in.). April 15th. —Present: 16 members.

FODDER CONSERVATION.—In a paper on this subject Mr. F. Lehmann explained how he had handled a crop of barley that had lodged badly. He connected a No. 5 chaffcutter and elevator with a 6ft. harvester (with the comb and beater removed) so that the elevator would drop the chaff on top of the thresher (a piece of the top of which had been removed). The offside wheel of the harvester was removed, and posts put under the machine. The cutter had an extended bearing, and by letting the outside bearing 2in. further in, there was room to fix a 9in. pulley connected with the flywheel of the harvester with a belt. The chaffcutter was driven by an 8-h.p. petrol engine, running 310 revolutions per minute, and the harvester flywheel at 166 revolutions per minute. Four men, one at the cutter, feeding, one throwing the sheaves from the wagon to the cutter platform, one cutting strings of sheaves, and one attending to bagging the grain and the chaff, handled a twoton load yielding 26bush. barley in 35 minutes. The chaff was cut to a length of This practice, he found, saved labor, obviated loss of grain, and provided a good chaff. The chaff was stored in wirenetting enclosures, and covered with straw.

FARM MANAGEMENT.—Mr. F. Bruns also read a paper in which he advised breeding sufficient horses to maintain the team. The animals should be allowed the run of a small paddock, and small regular feeds should be given. Pigs, cows, and poultry paid handsomely if properly looked after.

MEADOWS (Average annual rainfall, 35.52in.).

April 18th.—Present: 11 members.
SHEEP ON THE FARM.—Mr. W. Phillips read a paper on this subject in which he said:—'In this district, where mixed farming is practised, sheep are the best-paying sideline we can have. They are the least trouble, and give the best re-A big-bodied Merino ewe, crossed by a Lincoln ram, is the best means of securing breeding ewes. The ewes from this cross are strong, good doers, good mothers, and cut a nice fleece, but they are bad fencers. Having secured the breeding ewes cross them with a Dorset Horn ram. This will produce a big-boned lamb, and a quick grower. Put the rams with the ewes early in November, and they My practice is to put in a few acres of Algerian oats at the should lamb in May. end of March or the first week in April, and as the ewes lamb pick them out from the mob and put them in on the oats. The oats will keep them going until the grass gets a good start. Good crossbred ewes in an average year will bring in 15s. a head. Fifty sheep in a 10-acre paddock in one week would distribute 1cwt. of manure to the acre. This in itself is a big item on our farms, as in one year 100 sheep would drop about 50 tons of manure. When ewes are lambing visit them morning and evening. If a ewe has been down any length of time she will require to be walked around for half an hour before she will be able to stand alone. If the lamb is about let it suck the ewe whilst she is being held, for if she is timid she will leave the lamb. A drink of warm milk and a drop of brandy is a good thing to warm her. Maiden ewes need considerable attention during the first lambing. In crossing the Merino ewe with the Lincoln ram the breeder must be at hand during the lambing, as the Lincoln lamb has a large head, and the owner will find he will have to assist many of his ewes, or he will lose both ewe and lamb." Continuing, he said that fly-blown ewes could with advantage have the affected wool trimmed off and be treated with a strong solution of dip. He preferred to shear before the grass seeds dried, and described the method adopted in the shear-Dipping was a practice that was advantageous, apart from the legal obligation of the sheep owner. Small paddocks, to permit of frequent changes of pasture, would increase the carrying capacity of the land by 50 per cent. Ellis recommended the use of Merino rams on maiden ewes; Lincoln rams could be used with safety subsequently.

SOUTH-EAST DISTRICT

MOUNT GAMBIER (Average annual rainfall, 32in.).

May 13th.—Present: 18 members.

Stud Bulls.—Mr. Sassanowsky raised the suggestion that the cheese factories might purchase bulls for the use of the shareholders. That, he thought, would improve the quality of the dairy herds in the district. The idea met with the general approval of members.

SUGAR BEET.—The President (Mr. R. P. Pritchard) reported that the growth of sugar beet this year had been poor; the beet being woody and tasteless. Mr. Kilsby reported similarly.

QUESTION BOX.—A number of questions were dealt with. The consensus of opinion was that lime was not effective in checking the growth of sorrel. From the grazing point of view, the President said, the plant locally known as blue root was of value. Others thought it a nuisance in the land. Mr. Smith thought lime the best dressing to apply to lucerne. Mr. Pritchard advised mixing a certain amount of quicklime with well-rotted stable manure, and applying that. Members agreed that it was unwise to allow a bull to run with the cows continuously.

SANDALWOOD.

April 29th.—Present: nine members and 10 visitors.

PICKLING WHEAT .-- In a paper on this subject Mr. H. F. Oakeshoff said:-"There are several precautions which may be taken to prevent smut, i.e., (1) avoid, if possible, the use of seed from smutty crops or from districts where smut is prevalent; (2) promote a quick and vigorous germination of the seed; (3) avoid the use of smutty hay or chaff for the team, or of the manure of horses fed on smutty hay or chaff, as the passage through the animal in no way destroys the In addition to these precautions there are several methods of treating the grain itself, and of these the best and most generally used is the bluestone pickle. One pound of bluestone to 10galls. of water, which is a 1 per cent. solution, is sufficient, and a solution of greater strength only destroys the germinating power of the grain to a great extent, without having any greater effect on the smut. To counteract the corrosive effect of the bluestone, dip the grain in either lime water or salt water, preferably the former. It is important to see that the bags into which the pickled seed is put are themselves clear from smut. If the bags have been used for smutty wheat at any time it is necessary to soak them in the bluestone, and then dry them, taking care that no smut balls are left in. A smut ball which floats will not be killed by pickling, but if broken afterwards will infect any grains with which it comes in contact, and it must also be noticed that pickling only kills the smut spores or seeds that actually come into contact with the solution, so that smut in the soil, if any, will re-infect pickled wheat when it is sown, if the grain actually comes into contact with it there. Pickling is best done some time before sowing, so that the grain may be dried; for if it is sown, say, the next day or so, it will still be swollen to a certain extent, and the drill must then be set to sow slightly more. Dry ashes may be used. The grain may either be dipped, or spread on the floor and mixed with the pickle that way. Pickling on the floor is considered by some very good authorities to be best, as there is less likelihood of killing the grains when this method is employed; but dipping is easier and makes it possible to skim off the smut balls as they rise and float. I consider the dipping best for smutty samples, but then care is needed only to leave the seed in the pickle just long enough for it to get wet all over, when it must at once be taken out and drained. For clean wheat, I always prefer the floor. The cheapest, but at the same time, the most troublesome method of treating wheat is by hot The water should be from 130deg. Fahr. to 135deg. Fahr., and it must not be over this temperature, and should be kept at that heat by adding hot water from time to time. Each butt should be soaked for 15 minutes, and should then be taken out and plunged into cold water, before spreading out to dry."

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The results of experiments in connection with methods of agriculture, etc., stock and poultry diseases, insect and fungoid pests in South Australia and other lands are recorded, as well as the results of work at Roseworthy Agricultural College.

The experience of members of the Agricultural Bureau is made available to subscribers by the publication of reports of meetings of the Branches, including the more important papers and the discussion on them.

The Inquiry Department of the Journal furnishes replies by Government experts to all questions sent in, and advice is given to beginners in agricultural industries.

The Reference Library of the Department of Agriculture, which contains so many valuable works on agricultural subjects and thousands of bulletins issued by Departments of Intelligence in all parts of the world, is at the disposal of subscribers during office hours.

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CLARENCE GOODE,
MINISTER OF AGRICULTURE.

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CLARENCE GOODE,

Minister of Agriculture.

POINTS FOR PRODUCERS.

Upper Northern Farmers' Conference.

On Friday, July 14th, the Branches of the Agricultural Bureau situated in the Upper Northern District will meet in Conference at Orroroo. The proceedings will be opened by the Minister of Agriculture (Hon. C. Goode, M.P.), and addresses will be delivered by the Horticultural Instructor (Mr. Geo. Quinn), and the Poultry Expert (Mr. D. F. Laurie), in addition to which papers will be read by members of Branches.

Proceedings will open with a Pruning Demonstration, at 11 a.m., to be followed by sessions at 2 p.m. and 7.30 p.m.

Women and Agriculture.

The withdrawal of a large proportion of the male population for military purposes has opened the way for women to take an active part in many of the operations connected with rural pursuits. In fact, the stress of economic conditions has, in some cases, demanded the employment of women in agriculture. During the past month a deputation waited on the Minister of Agriculture with the object of inducing the Government to make provision for the training of women who desired to go on the land. It was pointed out that owing to the great wastage of life that was taking place, there would be fewer opportunities for women to marry. It was thought that certain agricultural pursuits, such as beekeeping, dairying, poultry raising, and fruit-growing would provide suitable employment.

The Minister of Agriculture intimated that the Government had already turned its attention in the direction mentioned, and had given consideration to the question, which was largely one of ways and means. It was realised that something would have to be done along the lines suggested.

Compulsory Sheep Dipping.

The attention of sheepowners is directed to the notice that, in accordance with the Stock Diseases Act Further Amendment Act, 1915, every owner of any sheep within the portion of the State comprising the district of Alexandra, the district of Albert (except the part thereof lying to the north of the railway line running from Tailem Bend through Pinnaroo to the Victorian Border), and the

district of Victoria, must dip his sheep with a poisonous powder dip during the period between the 1st day of September, 1916, and the 31st day of January, 1917. In default he is liable to a penalty not exceeding ten pounds for the first offence, and not exceeding fifty pounds for any subsequent offence.

Stock Diseases.

In order to prevent any confusion in the minds of stock owners as to their responsibility under the provisions of the Stock Diseases Act, attention is drawn to the following diseases which have been proclaimed as notifiable:—Actinomycosis, anthrax, cancer, catarrh. dourine (or equine syphilis), equine fever, epizootic lymphangitis, farey, foot and mouth disease, glanders, lice, pants (or contagious penumonia affecting swine), pleuro-pneumonia, rabies, rinderpest, scab, sheep pox, surra, swine fever, tick fever, trichinosis, tuberculosis. All suspected cases of any of the above diseases should be immediately reported to the Chief Inspector of Stock, Adelaide. Request for advice on stock complaints, not suspected of being contagious, and other veterinary advice through the medium of the Journal of Agriculture, should be addressed to the "Editor." This course is advised as letters or telegrams addressed to the Government Veterinary Lecturer, either by name or title, may be left unattended for several days whilst that officer is away in the country.

Imports and Exports of Plants, Fruits, Etc.

During the month of May, 1916, 404bush. of fresh fruits, 8,230bush. of bananas, 18,574 bags of potatoes, 2,699 bags of onions, and 43pkgs. of plants, seeds, and bulbs were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 140bush. of bananas (over ripe) were destroyed. Under the Federal Quarantine Act 4,629pkgs. of plants, seeds, and bulbs were examined and admitted from oversea sources. Of these 58 bags of canary seed were cleaned of noxious weeds, &c. Under the Federal Commerce Act 29,830 cases of fresh fruits, 10.633 pkgs. of dried fruit, 9pkgs. of preserved fruit, and 6pkgs. of plants were exported to oversea markets. These were consigned as follows:—For London, 28,054 cases of apples, 711 cases pears, 9pkgs. preserved fruit, and 1,528pkgs. dried fruit; India and East, 1,000 cases apples; New Zealand, 8,060pkgs. dried fruits, 6pkgs. plants, and 65pkgs. citrus fruit; for South Africa, 1,045pkgs. dried fruit.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, The Journal of Agriculture, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

"E. L. S.," Wilmington, has a cow with broken thigh.

Reply—Little can be done in the way of setting, but if the cow can be kept lying comfortably, the bone will most likely mend in a few weeks. Sometimes 10 drops of tincture symphytum on the tongue morning and evening helps.

"L. E. S.," Bute, reports that a cow urinates when milking begins, and during

the process.

Reply—This is of frequent occurrence, and is due to nervousness. See that she empties the bladder before milking begins; this can be brought about by gently rubbing below the bearing for a few moments. If this is done she will get out of the habit in a few days unless there is some disease present.

"B. J. H.," Wirrabara, has a horse with fetlock and foot like greasy heel, frog

slips off, grows again, and peels again, remaining soft.

Reply—The condition is known as canker of the foot; it is extremely difficult and costly to cure. Treatment that succeeds as well as any is to give the horse three times a day in feed one tablespoon of Fowler's solution of arsenic for a month, to dress the foot daily with equal parts of dry arsenical sheep dip and calomel, after having painted it with pure creosote, but this latter must not be allowed to get into the heel, by putting in a little grease. All diseased tissue must be ruthlessly cut away, and strong pressure on the ground obtained by lowering the heels as far as possible. A progress report will be esteemed after a month's treatment.

"R. K. H.," Tintinara, has a cow which drinks own urine.

Reply-The trouble is due to lack of food constituents, which might be replaced by allowing her a lick of bonemeal four parts and saltpetre one part. takes to this she will probably soon drop the habit, if she does not take to it put a handful in her mouth once or twice a day.

"L. C. R.," Wandearah, has a draught mare with injury to hind fetlock on

Reply—It is to be feared that the sesamoid joint at the back of the fetlock is injured, and will require a long rest to recover. It would probably be best now to blister the joint with the biniodide of mercury blister so often prescribed, and give her a rest till harvest.

"J. M.," Penong, reports that a light mare was driven 42 miles, seemed off color, and refused feed on return, received a series of home remedies of the right kind, but did not respond, and died. P.M.—Bots, bloodworms, and twist of large In foal and normal.

Reply-The treatment was quite correct all through; the bots had nothing to do with death, which was connected with the bloodworms that weakened the bowel and caused the flatulency that brought about the twist on account of the strain of the long journey. The bladder was found dry, because after death it relaxes, and the urine cannot be retained; the emptying of the hind bowel is due to the same thing. In this case the treatment should have been to have left her at home, and then given the nux, ammonia, &c., which would have probably been successful in the milder colic that might have ensued.

"H. V. H.," Coorabie, states that cows lie down and die, sometimes lose power

Reply-The complaint is what is generally called dry bible, and which is a deficiency disease similar to beri beri. The contents of the bible show no signs of phosphorus poison, and it is not likely to have occurred. The treatment for affected ones would be a quart of yeast once or twice a day, and 20 drops of nux vomica and bryonia alternately every three hours. Prevention would consist in allowing the cows a lick of one part saltpetre and four parts bonemeal, and if they will not take to it, putting a handful in the mouth once a day. For those which it may be feared may be attacked, two tablespoons of syrup of phosphate of iron twice a day for a week or 10 days will be found useful.

"N. A.," Coonawarra, has a pony lame.

Reply-The symptoms point to a deep-seated corn in the foot, which the smith may fail to find. Relief will probably follow putting the foot into a bran and linseed meal poultice for some days, and then turning out for a month, as it is evident that road work will retard recovery. The place to look for the corn is in the angle between the wall and the bar on the inside of the foot, and if as suspected, it is very deep, considerable searching will be required. If the poultice does good, kindly report, and further treatment will be advised.

"E. H.," Buccleugh, has a boar with white scale on body and ears.

Reply-The condition is most probably swine erysipelas, and is curable, but the tendency to it may be transmitted to the progeny, so that it would probably be most economical to have him cut and fattened. The treatment, if undertaken, would consist of a daily dose of a heaped teaspoonful each of sulphur, charcoal, and cream of tartar, all of which would be taken in food, and should be given for a week or ten days. A few outward applications of sulphur and oil 1 to 8, will also do good.

"C. P. S.," Lower Light, reports that lambs go lame at about a month in either hind or fore; nothing to be noted except heat above foot; no footrot, and recovery

on change of pasture.

Reply—The symptoms point to inflammation of the interdigital gland, known to shepherds in England as "'loore." Effective treatment for those that do not recover on change of pasture is to give an ounce or two of Epsom salts in feed, and to run a cord soaked in Stockholm tar through the claws daily. As these are not fed the salts can be omitted, or the worst ones might be drenched with them.

"G. G. C.," Geranium, has a chestnut gelding, rising seven, sleepy, stretches,

paws, and lies out flat.

Reply-The symptoms point to impaction in the blind gut (caecum), and improvement would follow the administration of 15 drops tincture nux vomica morning and evening for 10 or 14 days. In case of another attack, give a stimulant such as half a teacup methylated spirit with 25 drops essence of peppermint and half a pint of hot water; repeat as often as may seem necessary at half to one hour intervals, and follow with 11 pints raw linseed oil next day.

"J. T. C.," Glencoe West, desires to poison sparrows without endangering cats

or pigs that might eat the dead birds.

Reply—No poison will be harmless to pigs and cats, but unless they eat large numbers of birds they are not likely to get a fatal dose. The wheat can be bought ready prepared at most stores, and this saves trouble and risk. The general preparation is 20zs. to 40zs. white arsenic boiled up with a similar quantity of washing soda in half a gallon of water and thoroughly mixed with a bushel of wheat. Take the greatest care to clean the vessel used, and to label the wheat POISON.

"R. B. T.," Monarto, has a mare, eight years, which bites and rubs ribs and

shoulders and seems very itchy.

Reply-The symptoms point to mange, and relief will follow the daily administration of a tablespoon of sulphur in the feed for a fortnight. Either of the two following lines of treatment may be followed externally:—(1) Stand in sun for an hour or two, wash with soapsuds, carbolic if preferred, and allow to dry on, a few hours later wash off with soda and wipe over the parts when dry with a mixture of one part benzine to four of olive oil; this dressing will have to be repeated daily, while the washing process should be carried out once a week for a few weeks. (2) Wash with suds, an hour or two after wash off with soda, and while still damp dust

over the parts with powdered carbide of calcium; damp and dust every day for a few days, then every week for a few weeks. If the skin gets too dry apply benzine and oil. If the trouble is lice instead of mange, the first treatment will get rid of them.

"F. L.," Price, Y.P., seeks treatment for horses affected with wheat poisoning. Reply—The treatment has often been given. A quarter lb. baking soda in a quart of milk, and repeat in an hour or two if necessary. Allow to drink freely, and empty bowels with enemas of warm, soapy water. When possible brisk exercise. When foundered, bleed at neck, give 10 drops aconite morning and evening for a week or two, stand in wet mud or hot or cold swabs to feet, forced exercise. It is a pity the remarks in the Journal of Agriculture and the press on this point about this time last year were not remembered, the mortality would have not occurred. Strong stakes and barbed wire are even now less expensive than six dead horses and five crippled ones.

"T. S. R.," Kingston, has a stallion with thick leg, skin in folds, like a Vermont

Reply—The condition is not due to over feeding, but to impure blood, and is practically incurable. Give a tablespoon of sulphur in food once daily for a fortnight, and twice daily rub the leg well with a lotion of sugar of lead ½oz., sulphate of zinc ½oz., water ½ pint, methylated spirit ½ pint, and report progress after a fortnight, when the treatment will be changed.

"H. H. W.," Pinnaroo, has a cow which calved on May 10; stiff in loins.

Reply—It is possible she did not clean as she might, and the treatment so far, aconite and washing out with soda, have been all right. Try a drench of ½lb. Epsom salts and loz. ginger in a quart of warm beer, and follow it with 10 drops tincture pulsatilla twice a day on tongue for a week.

PRUNING MATCH.

CLARE AGRICULTURAL BUREAU.

The annual pruning match promoted by the Clare Branch of the Agricultural Bureau was held on Monday, June 5th, in Messrs. Patullo's and Ragless' garden at Bumburnie. Very favorable conditions favored the fixture, and the work done by the competitors was distinctly above the average. The judges were, for vines, Mr. H. E. Laffer (State Viticulturist), and for fruit trees, Mr. C. G. Savage (Manager Coromandel Valley Experimental Orchard).

The awards were as follows:-

Wine grapes—1st, L. Dux; 2nd, W. Smith; 3rd, W. Baker, T. H. Maynard (divided third).

Peach Trees-1st, W. Smith; 2nd, A. Burgess; 3rd, F. G. Hicks.

Juvenile Class-1st, R. Hague; 2nd, P. Hicks; 3rd, E. Duke.

Sultanas (2 vines)—1st, W. Baker; 2nd, G. Patullo; 3rd, A. Burgess and E. Glaetzer (divided).

Currants (2 vines)—1st, W. H. Bond; 2nd, A. Ward; 3rd, F. Knappstein.

Apples (3 trees)—1st, E. C. Glaetzer; 2nd, R. Glaetzer; 3rd, A. Burgess.

Apricot Class (1 tree)—1st, C. Glaetzer; 2nd, O. Dunstan; 3rd, L. Jarman and W. Bond (divided).

Sultana Class Special (1 vine)—1st, T. Maynard; 2nd, H. Baker; aggregate prize—1st, A. Burgess; 2nd, H. Bartlett.

In addition to the above, a number of certificates of competency were awarded.

In the evening a meeting was held in the local town hall, where an address on vines and manuring was delivered by Mr. Laffer. The prizes won during the day were presented by Mr. Savage.

SALTS INJURIOUS TO VEGETATION AND THEIR RELATIONSHIP TO THE IRRIGATION OF ARID AND SEMI-ARID REGIONS.

[An address delivered before the Conference of River Murray Branches of the Agricultural Bureau by ARTHUR J. PERKINS, Director of Agriculture.]

Cultivated plants are known to suffer from the effects of salt in many parts of South Australia; and this both under ordinary conditions of farming and when water is applied to the land in the form of irrigation. This phenomenon is not peculiar to South Australia, but common to all countries subject to an arid or semi-arid climate, i.e., a climate in which the rainfall is scanty, say, appreciably below 20in. per annum. Hence we find troubles of this kind arising in India, throughout North Africa, in many of the States of North America, in various portions of Asia, &c.

If salt is occasionally dangerous under ordinary conditions of farming, it is infinitely more so when water comes to be added to the land for the purposes of artificial irrigation. Land sufficiently salt-impregnated to interfere with ordinary farming operations is more or less fixed in its area from year to year; not absolutely so, however, since salt patches are known to extend in area after periods of heavy rainfall. Experience shows, however, that when irrigation is resorted to, land which to that moment had appeared free from salt may begin gradually to show signs of salt impregnation; and probably thousands of acres have been slowly ruined in this fashion. Hence the paramount importance of the salt question wherever irrigation is practised under arid or semi-arid conditions.

WHAT IS UNDERSTOOD BY SALT.

The term "salt" used in this connection is rather equivocal; it neither corresponds exactly with the meaning in current popular use, nor with the special meaning assigned to it by chemists. The American term, "alkali"—black and white alkali—is open to similar objections, since, whilst strictly correct so far as "black alkali" is concerned, it lacks in accuracy when applied to "white alkali."

From our present point of view salt may be taken to represent complex saline matter—i.e., a substance having roughly the appearance and consistency of ordinary table salt wholly soluble in water, and when present in soil layers in a sufficient state of concentration proving more or less injurious to most plants.

It is possible, however, to inquire more closely into the exact nature of this saline substance; and for the purpose I have indicated, in

Table I., the exact chemical composition of the salts found in land affected by salt on Yorke's Peninsula. The land in question had carried a fair crop of wheat in the preceding season.

Table I.—Showing Soluble Salts present in Yorke's Peninsula Land said to be Affected by Salt.

Soluble Salts Present.	In First 6in.	In Second 6in.	6in.	In First 18in.
(1-1-t	°/ 0:003	°/ 0.016	0.007	Lbs. per acre.
Calcium carbonate				
Sodium carbonate	0.014	0.003	0.018	569
Calcium chloride	0.096	0.007		1,674
Magnesium chloride	0.034	0.054		1,430
Sodium chloride	0.367	0.268	0.172	13,124
Calcium sulphate	0.055	0.126	0.002	
Magnesium sulphate		-	0.017	276
Sodium sulphate			0.019	309
Total injurious salts in first	18in. of so	il	<i></i>	. 17,382

In this Table there are two soluble salts—calcium carbonate and calcium sulphate—neither of which are in any way injurious to vegetation; the remaining six represent practically all the injurious soluble salts usually found in land said to be affected by salt. They are not necessarily all present, however; nor are their respective proportions uniform; at times one salt predominates, at others another.

Of these six salts sodium carbonate would appear to be the most dangerous, i.e., the one which is most injurious in the lowest state of concentration, and which plants appear to be able to tolerate According to Hilgard, less than 0.1 per cent. of sodium carbonate is more or less dangerous to vegetation in heavy soils. It is the presence of sodium carbonate in the soil that gives rise to what Americans call "black alkali." The alkaline solution of sodium carbonate has the power to dissolve the finely divided black organic matter, which it leaves on the surface soil, coloring the latter in dark black patches. Sodium carbonate, however, is never present alone; it is usually associated with sodium chloride or common salt, from which it is probably derived in the course of reactions in the depths of the soil. Other salts may also be present, such as magnesium sulphate, sodium sulphate, etc., but usually in smaller pro-The sodium carbonate which accumulates in the surface soil appears to corrode the stems of plants where they connect with the root system, causing death, or, at all events, the stunting of the plant.

Unfortunately the action of sodium carbonate is not confined to the direct injuries it inflicts upon plants; it has a further very serious influence on the mechanical condition of the soil. Less than 0.1 per cent. is sufficient to deflocculate heavy soils, and render them impervious to water. This sometimes happens on the immediate surface of the soil; but more frequently, in natural conditions, 6in. to 8in. below the surface, where an impervious hard pan is formed, through which the roots of cultivated plants are, as a rule, unable to break. These direct and indirect injuries render sodium carbonate the most injurious form of saline matter affecting plants.

Next to sodium carbonate comes sodium chloride or common salt, it comes second in importance chiefly because of its greater preponderance. On the whole, plants are probably more sensitive to magnesium chloride, which, however, is usually met with in smaller quantities. According to Hilgard, 0.25 per cent. of sodium chloride is injurious to most cultivated plants.

Sodium sulphate is probably three times less injurious than common salt, that is to say, plants can as a rule grow in contact with three times as much sodium sulphate as common salt. It is the chief constituent of "white alkali" in America.

ORIGIN OF SALT.

It is very important that we should realise what is the origin of these saline substances so injurious to vegetation. It would appear that, according to circumstances, they may derive their origin from four different sources.

1. From layers of soil material or rocks which in past geological ages have become more or less saturated with saline matter. This would be the case, for example, when irrigated land overlies the bed of an ancient sea, from which marine salts may have been deposited. Or, again, saline matter may ooze out from the faces of hill slopes when sloping layers of rocks form an outcrop on their surface.

Examples of this kind are known to exist in various parts of the world, and the origin of salt springs is probably connected with them; it behoves us, however, to realise that whilst cases like these are existent, it is true, they are at the same time exceptional. The distribution of salt, on the other hand, over the soils of the arid and semi-arid regions of the earth is practically universal, and their presence cannot possibly be connected with a purely accidental factor of this kind.

2. From use of irrigation water unduly charged with saline matter.—This factor, too, will undoubtedly operate in certain cases. No natural water, not even rain water, is absolutely pure; and, indeed, in Nature all waters contain in solution salts injurious to vegetation.

If we take the purest water we known of—rain water—we shall find it to be more or less contaminated with impurities according to localities in which it is collected. Practically everywhere, however, it contains a certain amount of chlorine, the basis of common salt; within the neighborhood of the sea the proportion is greater than in

inland districts; but to some extent or other chlorine can practically always be detected in rain water.

In England, for example, it is calculated that on the average rain water contains 0.363 parts of sodium chloride (common salt) in every 10,000 parts of rain that falls; hence a district with a 20in. fall would receive annually from the skies 16½lbs. per acre of common salt.

At Caen, a French town in the neighborhood of the British Channel, careful observations show that rain brings annually to the soil the following quantities of salts injurious to vegetation:—Sodium chloride, 33.0lbs. per acre; potassium chloride, 7.4lbs. per acre; magnesium chloride, 2.2lbs. per acre; calcium chloride, 1.6lbs. per acre—total injurious chlorides, 44.2lbs. per acre.

These quantities, however small they may appear in annual falls, would in the long run, say over a series of centuries, represent very serious accumulations if Nature had not provided special means for their removal. But whatever may be the case, we can see that rain water, at all events, represents one of the general sources from which some portion, at all events, of the salts injurious to vegetation may have been derived.

If we consider other waters, the sea, river waters, underground waters, we find them all holding in solution, in varying proportions, these salts that we have defined as being injurious to vegetation. This is shown very clearly in Table II., which follows.

Table II.—Showing Principal Salts in Solution in the Sea, in Rivers, and in Some Underground Waters.

	Average Sea	Average of 19 Great Rivers of the World.	Some Local Well Waters.					
	Water.		Rosenthal. Grains per		Port Lincoln.	Adelaide		
Calcium carbonate Calcium sulphate Magnesium carbonate .	1·40 97·65	76·57 — 23·70	$\begin{array}{c} 21.50 \\ 7.28 \end{array}$	$23.50 \\ 36.56$	$\frac{21 \cdot 10}{2 \cdot 45}$	17·50 3·88		
Magnesium sulphate Magnesium chloride	144.97 249.27	10.14	83·70 10·63	$34.29 \\ 62.62$	11.76 17.39	1·24 21·58		
Sodium carbonate Sodium sulphate Sodium chloride	11.62	2·26 5·32	429.20	650-80	 125·15			
Potassium chloride Potassium nitrate	52.29	1·29 5·15			_			
Ammonium nitrate Calcium phosphate Undetermined		0·33 1·95 26·26				 4·59		
Total salts in solution	2434-60	152.97	572.70	837-40	185.00	96-70		

In irrigation waters, although waters very highly charged with saline matter have sometimes been used without damage on light, well-drained soils, nevertheless, a combined total of 100 grains per gallon or over of chlorides of any type together with carbonates and sulphates of sodium and magnesium, must be looked upon as excessive.

We see from this Table, in the first place, that all the salts described as injurious to vegetation are to be found as the chief salts in solution, first in the sea, secondly in rivers and running waters, and thirdly in underground and well waters. It follows, therefore, that whatever the source from which it is derived, irrigation water must bring to the soil a certain proportion of injurious salts; and unless these salts are absorbed by vegetation when in a state of due dilution, they must in the end tend to accumulate in the soil, to the ultimate detriment of its general fertility.

Not all waters, however, are equally charged with saline matter in solution; the proportion in sea water—2,434 grains to the gallon—we know, from experience, to be excessive. It is not easy, on the other hand, to distinguish absolutely between water which is likely in the long run to prove injurious to vegetation, and water which may be described as good irrigation water. Clearly the smaller the proportion of salts present the better the quality of the water from the view of irrigation; but it is almost impossible to state definitely the proportion of salts likely to prove injurious. Many a water, for example, may be used safely on some types of land, because natural drainage is good, and the salts show no tendency to concentration in the land; in heavy impervious clay land, on the other hand, from which the surface evaporation of water is frequently excessive, water containing apparently very low proportions of saline matter may, in the course of time, reduce the soil to comparative barrenness.

If we examine the well waters indicated in Table II., there are two of them—the Rosenthal and the Coorabie waters—which are evidently quite unfit for irrigation purposes. One of them—the Adelaide water, with not more than about 70 grains of injurious salts to the gallon—may be described as very fair irrigation water; nevertheless, we should recollect that even in this case 36in. of water per annum represents over 3½ tons of injurious salts per acre, or about 1 per cent. of salt in the first three inches of soil. The fourth sample—the Port Lincoln water—with over 150 grains of injurious salts to the gallon, is doubtful water—indeed, in most cases it would probably prove rapidly injurious to vegetation. Irrigation water of this kind, however, has at times been used with success where the irrigated land is light and natural drainage perfect.

Indeed, although it is difficult to credit it, Hilgard quotes "Egyptian practice" as using irrigation water containing as much as 214 grains of total salts to the gallon.

The fact that we find the same salts in the land and the water which runs over its surface will lead us to imply another and more general source of origin for the salts injurious to vegetation, and that is the gradual decay and weathering of the various rocks and soil particles, the majority of which contain some trace of chlorine and of other elements which have been referred to as injurious to vegetation.

3. It may be agreed that the great bulk of the saline matters found in the soil, and subsequently in waters that have come in contact with the soil, are derived from the decay of the particles of the soil themselves; and the question naturally arises that, if such is the case, why is it that salts accumulate in some parts of the world and not in others; and, in particular, why in soils in which they were not previously apparent do these saline matters act injuriously on vegetation very shortly after irrigation has been applied to the soil.

It may be stated very definitely that the accumulation of saline matter in the soils of arid and semi-arid regions is in no way connected with any peculiarity in the composition of the rocks from which they are derived. These rocks are very much the same, both in the moist and arid portions of the earth. It is relatively low rainfall, accompanied by intense surface evaporation, that is chiefly responsible for the accumulation of saline matter in these arid and semi-arid regions.

In the moist portions of the earth a well-distributed rainfall periodically washes and leaches out of the surface of the earth its soluble salts, and it is these salts that we find subsequently in the running streams, and which ultimately find their way into the sea. The leaching influence of rain water in the moister countries is not often realised; we can judge, however, somewhat of the effect from the following examples.

The Thames, according to Geikie, carries past Kingston in solution 19 grains of mineral salts in every gallon that flows, or 1,502 tons in every 24 hours, or 548,230 tons of dissolved mineral matter in every year. The Elbe drains about 20,000 square miles in Bohemia, and in leaving this region takes away yearly 7,860,000,000 cubic yards of water, carrying with them in solution 611,561 tons of mineral matter, of which 24,868 tons are common salt, *i.e.*, over 1 ton of common salt per annum for every square mile drained.

T. Mellard Read calculated that running waters and streams removed in solution from the rocks of England and Wales 8,370,630 tons of mineral matter in solution yearly; that the Rhine removes yearly 92.3 tons of solids in solution per square mile of country drained; the Rhone 232 tons, the Danube 72.7 tons, and the Mississippi 120 tons.

These examples should afford convincing proof of the efficiency of rain water to leach out of the earth soluble injurious salts in all regions with sufficiently heavy rainfall. It should be added, however, that in these regions, in addition to soluble injurious salts, other soluble matter of value to agriculture is also leached out of the soil. Hence the soils of humid regions tend in the course of time to become depleted of lime, of nitrogen in the form of nitrates, and to a less degree of potash salts and phosphoric acid. The elements of fertility, therefore, as well as those conducive to sterility, tend in the humid region to be washed away into the sea; hence, in these regions the practice of heavy manuring is imposed upon agriculturists to a far greater degree than is the case in the arid regions of the earth.

Let us consider the position in countries of low rainfall. In these countries, although large rivers are occasionally to be found traversing them from end to end, these rivers do not drain the country in the sense that they would do so in more humid regions. These rivers spring from distant inland sources of far heavier rainfall than the land through which they flow, generally from mountainous or tropical regions, and it is on these distant regions alone that the rivers depend for the great bulk of their water supply. There are little or no local tributaries fed by the scanty rainfall of the arid countries through which they pass.

In these arid regions, therefore, the rain that falls finds an outlet into local streams, and thence into the sea only to a very limited extent, i.e., in the case of heavy thunderstorms, the water from which runs rapidly over the surface without penetrating the soil to any extent, and carrying away in solution a minimum of soluble matter. The bulk of the rainfall, therefore, sinks into the earth, is absorbed partly by vegetation, and partly returns to the surface under the influence of the intense summer heat which usually obtains in these districts and is responsible for heavy surface evaporation. In this upward rise of the water soluble salts are taken into solution, brought up from the depths of the earth to the surface, where they remain in gradually increasing concentration as the water which conveved them disappears under the influence of surface evaporation. Winter rains will, as a rule, tend to wash back these salts to the depth to which local rainfall is able to penetrate, a depth which is never great in districts of low rainfall. Hence, in ordinary circumstances, natural vegetation is not seriously affected by the presence of these injurious salts, apart, however, from those exceptional cases in which the proportion present is excessive. In ordinary circumstances the woody perennial plants have their roots deep seated and beyond the danger zone of concentration, which is always close to the surface; annual herbage, on the other hand, germinates and grows in the winter months, dying back in the summer; that is to say, growth is made at the time of the year when these injurious salts have been washed down into the depths of the subsoil, whereas growth comes to a standstill when the salts begin to rise and concentrate near the surface.

THE INCIDENCE OF SURFACE EVAPORATION IN ARID AND SEMI-ARID REGIONS.

The accumulation of salt in the surface layers of the soil being very largely the resultant of intense surface evaporation, it is worth noticing how much greater is this evaporation in arid and semi-arid regions than in countries with a humid climate. In this connection surface evaporation is chiefly a factor of heat and dryness in the atmosphere—conditions which obtain over the greater part of the year in most arid countries.

It is not, of course, possible to measure directly to any advantage surface evaporation from the soil, since this evaporation must vary with the character of the soil and the condition of the surface. Hence, for purposes of comparison it is customary to indicate local evaporation by the quantity of water evaporated from a free water surface of an open tank exposed to sun and weather, and it is figures of this kind that are indicated below in Table III.

Table III.—Showing Mean Annual Evaporation Comparatively with Mean Annual Rainfall in Various Localities.

Station.	Mean Annual Evaporation. Inches	Mean Annual Rainfall. Inches.
London (England)	20.66	25.11
Munich (Germany)	24.00	24.00
Oxford (England)		24.58
Melbourne (Victoria)	38.35	25.44
Sydney (New South Wales)	42.09	47.99
San Francisco (United States of America)	45 ·00	24.00
Adelaide (South Australia)	54.50	20.50
Perth (Western Australia)	65.87	33.44
Dubbo (New South Wales)	81.03	$22 \cdot 43$
Brisbane (Queensland)	85.37	48.05
Coolgardie (Western Australia)	86.43	9.41
Alice Springs (South Australia)	97.44	10.89

We may note, therefore, that in damp moist localities the mean evaporation may be less than the annual rainfall; the same would appear to apply in sub-tropical localities like Sydney. In these circumstances not only is the atmosphere constantly moist, but from our point of view there can be little or no tendency to the rise of salt under the influence of surface evaporation.

On the other hand, in the more arid regions the mean evaporation will not only exceed the annual rainfall, but may in extreme cases be as much as eight or nine times the annual rainfall, as seems to be the case at Coolgardie and Alice Springs.

These facts will serve to emphasise the position in so far as the rise of salt in arid regions, under the influence of surface evaporation, is concerned.

REASONS THAT MAY ACCOUNT FOR LOCAL ACCUMULATION OF SALT IN SPECIAL SPOTS.

We must admit, in the first place, that apart from a few exceptional localities in the Hills, all the country to the north of Adelaide is subject to what may be called arid or semi-arid conditions. Hence all this country is more or less salt, as indeed we know to be the case from the excellent condition and health of livestock depastured over these regions. But although there may be appreciable quantities of saline matter in the soil, it is only in comparatively isolated cases that the proportion present is such as to interfere with ordinary crop operations. And it may be asked, in the circumstances, what are the reasons that have led to exceptional concentration of salt in these special localities.

Manifestly each case would have to be judged on its own merits; and even then it may not always be possible to trace out accurately the factors chiefly responsible for the concentration. In most cases their influence and action will date back to far distant geological periods, when local surface conditions were quite different from what they are at the present time. In most cases, however, the general levels of the ground will have to be taken into account; for instance, it is natural to assume that a hollow into which neighboring waters drain will lead to the local accumulation of salt. We see this on a large scale in the formation of salt lakes and lagoons; on a small scale it will give rise to salt patches on which vegetation is unsatisfactory.

Then, again, the nature of the soil will frequently have an influence on the concentration of salt. In some soils the capilliary action is exceedingly energetic, with the result that large quantities of water holding salt in solution are brought to the surface, and salt accumulates accordingly. This is the case with close-grained clay soil. In other instances the soil is light, with comparatively little power to waste the subsoil moisture. We never hear of salt patches in light sandy country.

ACTION OF IRRIGATION UNDER SEMI-ARID CONDITIONS OF CLIMATE ON SOLUBLE SALTS PRESENT IN THE SOIL.

We have next to consider what is the action of irrigation water on land known to contain soluble salts in quantities that have not hitherto proved injurious to vegetation. The action of water in this connection

September,

1914.

March.

1915.

September.

1915.

Plots.

Per acre

is well illustrated in Table IV., in which are shown the quantities of common salt per acre found on newly irrigated land at Roseworthy between September, 1913, and September, 1915.

Table IV.—Showing Gradual Increase in Sodium Chloride (Common Salt) on Newly Irrigated Land at Roseworthy College.

March,

1914.

September,

375lbs.

	Lbs. of	Sodium Ch	loride per ac	re, lft. deep).
A	149 192 337 661 535	488 582 949 1,521 1,012	408 533 674 909 5,747	954 1,603 2,731 2,840 1,614	191 605 857 1,877 1,386
In 5 acres	1,874lbs.	4,552lbs.	8,2711bs.	9,742lbs.	4,916lbs

9101bs. 1,654lbs. 1,948lbs. 9831bs It should be stated that the land referred to in Table IV.—11 acres in area—was carefully graded in the winter of 1913 to an even fall of 4in. in the chain, the highest plot being Plot A, and the lowest Plot E; hence drainage waters would naturally accumulate in the This plot was regularly under irrigated crops—winter and summer—throughout the period of two years.

It will be noted that before irrigation operations started the amount of common salt per acre found to be present in the first foot of soil was represented by 375lbs.—an altogether negligible quantity. By the following autumn salt present in the first foot of soil had risen to 910lbs. to the acre; and by the autumn of 1915 to 1,948lbs. to the acre, i.e., about six times as much as was originally present in the course of about 18 months. In September, 1915, the salt present had fallen to 983lbs. to the acre.

We can see clearly how the irrigation water must have acted in the case before us; it was heavily applied during the times of the year when little or no rain falls, probably at the rate of 3ft. to 4ft. to the This water, coming in addition to the normal rainfall, must have penetrated to a good depth, certainly beyond the first foot of soil which Here it will have dissolved saline matter, which was was examined. previously uniformly distributed in the soil. As the influence of surface evaporation made itself felt this water would tend to ascend to the surface, bringing with it into the first foot of soil salt which had previously been distributed over the second, the third, and perhaps even the fourth foot of soil. We should notice, too, the tendency of the soil to lose some of this accumulated saline matter during the winter months, when the rainfall brings into action its leaching powers, and when surface evaporation is reduced to a minimum.

September, 1915, after a wet winter, we find the amount of salt falling from 1,948lbs. to 983lbs. to the acre foot. It is true that there is an anomaly in September, 1914, when the total quantity of salt present is nearly twice as much as that found present in the preceding autumn. This, however, was the exceptional year of drought, when little or no winter rain fell, and when evaporation continued intense throughout the year. It should be noted, moreover, that this exceptional winter accumulation of salt was practically restricted to Plot E, towards which the drainage waters ran.

Table V. illustrates in a more striking manner the varying autumn and spring distribution of injurious salts on land that had been irrigated.

Table V.—Showing Autumn and Spring Distribution of Common Salt in Roseworthy Irrigation Plot.

(10 2000000 1111	9 = 9 accon	2 000.	
	Soil Depths.	March, 1915.	September, 1915.
Plot A	Inches. 0-3 3-6 6-9 9-12 0-12	Lbs. per acre. 658 104 98 94 954	
Plot B	0-3 3-6 6-9 9-12 0-12	1,132 152 151 168 1,603	100 123 124 258 605
Plot C	0-3 $3-6$ $6-9$ $9-12$ $0-12$	1.563 404 395 369 $2,731$	87 163 252 355 857
Plot D	0-3 3-6 6-9 9-12 0-12	1,380 361 447 652 2,840	211 396 541 729 1,877
Plot E	0-3 3-6 6-9 9-12 0-12	861 277 240 236 1,614	404 433 355 194 1,386

We notice, therefore, that practically without exception in the autumn of 1915 salt had accumulated on all the plots, chiefly in the first 3in. of soil, in which on Plot C it attained to as much as 1,563lbs. to the acre. In the majority of cases, too, the proportion of salt present in the land decreased regularly and systematically the deeper the soil was examined.

On the other hand, in the spring of 1915, after a wet winter, we note, in the first place, that the total quantity of salt present in the

first foot of soil had become very much reduced; and, secondly, contrary to what had happened in autumn, the proportions of salt present increased with the depth at which the sample of soil was taken. Hence, after the winter rains, with the exception of the low-lying Plot E, there was less salt in the first 3in. of soil than in any other portion.

We are now able to realise more clearly the action of irrigation waters newly applied to soils in which salt is freely distributed throughout, but is nowhere present in a dangerous state of concentra-We see this water, as a rule, applied in the hot months of the year: it descends into the depths of the soil, dissolving in its downward course the evenly distributed salt; later on, urged thereto by surface evaporation, it rises again into the surface layers, and thence passes off into the atmosphere, leaving behind it on the immediate surface a gradually increasing mass of dangerous salts. from time to time the winter rains may, if sufficiently heavy, wash back these salts into the subsoil, ultimately a time always comes when the concentration of salt is such as to render the land more or less barren to most cultivated plants. The danger is greatest, perhaps, where permanent woody plants, such as fruit trees and vines, are concerned. it is not, as a rule, however, their feeding roots that are affected, since the latter are usually to be found at great depths in the soil, where salt concentration does not, as a rule, take place. Their stems, however, and particularly the root crown, are brought in contact with these concentrated saline substances, with the result that they are corroded, and either die or become more or less unprofitable. - Annual crops, on the other hand, may, for some time at all events, escape injury, particularly if they are early spring sown; by that time the winter rains should have had time to wash down the salt beyond the seed bed, and the plants are able to germinate and grow without any very serious difficulty. There may, on the other hand, be difficulty in raising winter crops, since autumn rains are never sufficiently heavy to leach the soil, and evaporation continues unchecked right into early winter; hence the concentrated salts check germination, and no crops can be grown satisfactorily.

It should be pointed out that all these evils become far more accentuated when excessive quantities of water are used for irrigation purposs. The ideal in the irrigation of arid regions is to use no more water than is absolutely necessary for the healthy growth of whatever crop may be raised. Every gallon in excess of this amount represents so much more water left behind by the plant, and which surface evaporation will sooner or later call up to the surface with its accompanying quota of dangerous salts. Moreover, excess of water, unless insuperable physical obstacles intervene, means further penetration of

the water into the depths of the earth, and consequently contact with untapped salt supplies, which are later on unnecessarily brought to the surface. This, indeed, is what happens normally on unirrigated lands after exceptionally wet winters; in the summer that follows we frequently find the old salt patches extending in area, and new ones appear where they had not previously been known. This is merely the natural consequence of the deeper penetration of an exceptionally heavy winter rainfall.

The excessive use of irrigation water is particularly reprehensible where the local water table is relatively close to the surface. The excess of water in this case will, in the first place, have the effect of raising the water table, which may lead to the drowning of the roots of whatever plants may be grown on the land; concurrently a larger quantity of salts will be brought to the surface than would otherwise have been the case; and, finally, the chlorides and sulphates of sodium may, under the influence of lack of aeration in the soil and the excessive presence of carbon dioxide lead to the formation of the far more dangerous sodium carbonate.

HOW TO DEAL WITH SALT LAND.

It is not perhaps easy to indicate any one special method of treatment which is likely to answer for all cases alike. There are, however, certain general rules which can be pointed to with advantage.

THE CONNECTION BETWEEN IRRIGATION AND DRAINAGE IN ARID REGIONS

The reclamation of salt land under humid conditions of climate is comparatively simple; and we have a telling example of this in the Dutch treatment of land reclaimed from the sea, which is said to carry satisfactory crops one to two years after the sea waters have been excluded from its surface. The leaching influence of the local rains appear to be sufficient in Holland to wash away all the salt substances originally present. This implies, too, of course, that the soil of the Polders must be very light and pervious, with natural drainage conditions approaching perfection. I believe that it was suggested by the late Surveyor-General, who had visited Holland, that similar methods of reclamation should be tested on the Murray Swamps. Unfortunately, both climate and situation are such as to remove any possible chance of success in this direction. The exposure of the bare soil to the action of surface evaporation would, under our climate, be quite sufficient to call back to the surface in the summer whatever salts the winter rains may have washed down into the depths. be stated with absolute definiteness that under arid conditions of climate, no leaching methods, whether natural or artificial, are likely to be successful in the reclamation of salt land unless effective provision is made beforehand for the complete removal of the drainage water which had dissolved the salts. Hence it is almost an axiom in the irrigation of arid areas that, if success is to be permanent, "irrigation" and "drainage" must go hand in hand; in other words, you must always make provision for the removal of the salt-impregnated waters which growing crops have not been able to utilise.

I am able to give a striking local example of the danger of irrigating salt-impregnated land without having first made ample provision for the removal of drainage waters.

Last February a land owner, who had recently reclaimed some Murray Swamp land, wrote to me that he had experienced considerable difficulties over the rise of salt on this land. He proposed, he said, to cut drainage ditches through the land, and subsequently to leach the land with an abundance of fresh water. Before doing this, however, he forwarded me some samples of soil, which he wished analysed for injurious salts. One lot of samples was from land that had never been irrigated; a second lot from land that had been irrigated once; and a third lot from land that had been irrigated twice. It should be added that no provision for drainage had as yet been made; and the owner wished to ascertain how much salt had been removed from the land by these trial irrigation operations. I wrote back pointing out that in all probability the result of the analysis would be such as to show an increase, and not a decrease, of salt in the land that had been irrigated. Figures calculated from the data of the analysis and bearing on this point are shown below in Table VI.

Table VI.—Showing Rapid Increase of Surface Salts in Recently Reclaimed Murray Swamp Lands Irrigated, but not Effectively Drained.

Treatment of Land.	Total Soluble Salts.	Common Salt.
	Lbs. per acre.	Lbs. per acre.
Never Irrigated— First four inches	39,585	22,663
Second four inches	13,910	8,580
First eight inches	53,495	31,243
Irrigated Once—		
First four inches	73,125	46,594
Second four inches	14,647	9,252
First eight inches	87,772	55,846
Irrigated Twice—		
First four inches		76,007
Second four inches	28,752	19,424
First eight inches	134,779	95,431

It will be noted, in the first place, that although the analysis made concerned only the first Sin. of soil, the quantity of salt accumulated there is enormous, more than sufficient, indeed, to account for any cropping failures that may have arisen. Further, as I anticipated, there is far more salt in the surface layers of the land that had been irrigated than in those of the land that had never been irrigated—practically twice as much after one irrigation, and three times as much after two irrigations. We should realise, therefore, that land of this type can be reclaimed of its excessive salt only by the action of abundant flooding with fresh water, and the speedy removal of the salt-impregnated drainage waters by an adequate system of drainage.

The relative costliness of under drains, or pipe drains, has always militated against their general use. Nevertheless, where the land is argillaceous and close-grained in texture, pipe drains alone will effectively remove surplus drainage waters. Fortunately, much of our irrigated land in South Australia is not of this type. Where land is light and porous, open drains, if not too far distant apart, will often prove effective. One mistake in this connection, however, is frequently made, namely, the use of shallow drains without sufficient fall to lead to the rapid discharge of drainage waters. If these shallow drains are to stand for weeks, and perhaps for months, full of salt-impregnated water, in so far as their practical utility goes, they might just as well not exist; indeed, they become a source of danger to the grower, since they represent a reservoir of poisonous moisture upon which the neighboring porous soil can draw. It should not be forgotten that saltimpregnated moisture can extend laterally as well as vertically.

I must insist, however, that in this connection underground pipe drains represent the only really efficient weapon against the rise of salt in arid regions in the hands of the grower. And it is highly questionable to my mind whether, in the matter of irrigation lands, we are not unreasonably frightened of the initial capital expenditure they certainly entail. It is, after all, only a question of relative values. Pipe drains have been used successfully to remove the surplus moisture from the far less productive lands of moister countries, and it seems incredible that the high production of land under local irrigation should not be able to bear the cost of under-drainage, should it be the only means of saving the land from complete sterility. I do not know what capital value you place on the irrigated lands on the banks of the Murray. I know, however, that in Egypt, where some 6,000,000 acres are worked by tenant farmers, the average rental value is £5 an acre, representing a capital value of £100. If, therefore, land of this or similar value cannot bear the cost of efficient drainage, we may as well give up all idea of successful irrigation colonies. I do not wish to insist that pipe drains must always be used where land is irrigated; I do maintain, however, that where other methods have failed, recourse should be had to them rather than throw up as useless valuable tracts of land.

The first definite principle we are therefore able to establish in connection with the irrigation of salt land, or land likely to become so—and in the arid regions that concern us all land that is irrigated is liable to become salt sooner or later—is that adequate provision for drainage must precede irrigation. Secondly, if salt is known to be present in large quantities, this salt can be leached out of the land by repeated floodings, so soon as adequate provision has been made for drainage.

THE RAISING OF SALT-LOVING CROPS.

It is often suggested that when land is salt it can be utilised to best advantage by growing on it crops said to be salt-loving. These crops, besides yielding a direct return, are supposed to have the additional advantage of removing yearly from the soil large quantities of salt; and in the course of time these repeated drains on the salt stocks of the land may have the effect of sweetening it. Unfortunately the number of crops that can be grown in this fashion are very limited. Mangolds are frequently quoted as a suitable crop for the purpose. Unfortunately, from the local point of view, they are an expensive crop to raise, because of the amount of labor they involve; moreover, not even mangolds will germinate satisfactorily if the surface soil is too strongly impregnated with salt; as a spring-sown crop, however, they should, as a rule, generally escape this contingency.

Black Japanese millet, or *Panicum crus galli*, is a crop which can be grown with greater advantage under our conditions. It was raised with great success for hay purposes in 1914 by the Director of Irrigation on the Murray Swamps. In an article which I wrote on the subject I was able to show that the average crop had removed from an acre of soil about 400lbs. of injurious salts. This figure, when compared with the stocks of the soil, may not appear to be very large; but if repeated several years in succession must in the end materially affect the proportions of salt present in the land.

REMOVAL OF THE SALT-IMPREGNATED SURFACE LAYERS.

The suggestion has sometimes been made that very large quantities of salt could be removed from the soil if in the early autumn months, when the surface concentration of the salts is at its maximum, the first 2in. or 3in. of soil were to be scraped off with a scoop and removed from

the irrigation plot. Such a practice would undoubtedly be successful if carried out systematically; it may indeed be estimated that if the bare surface of the soil were left exposed throughout the summer to the action of surface evaporation, and irrigated periodically from time to time, that in the autumn months probably one-half, or more, of the soluble salts present in the first 3ft. or 4ft. of soil would be concentrated in its upper 3in. There can be no doubt, therefore, that the removal of this surface layer, if practicable, would do much towards sweetening the land. There are, of course, obvious objections to the practice; thus there is no doubt that, from other points of view, the surface soil is more fertile than the subjacent layers, and its removal might be looked upon as resulting in general impoverishment of the Indeed, we see this point brought out in the general objection of the farmer to bring the subsoil to the surface, an objection which is perfectly valid under comparatively moist conditions of climate, but which does not, as a rule, hold good in the arid regions which at present concern us. In these regions the general character of the soil, and its fertility, remain very much the same to great depths. generally open and well aerated, and we rarely come across the sour stiff clay soils characteristic of wet countries. I have in mind an example of this kind which came within my own personal experience. We were grading, at Roseworthy, an irrigation plot, so as to give to it a uniform fall of 4in, to the chain; in carrying out the work we had to remove from the lower portion of the plot as much as from 16in. to 18in, of surface soil, which had the effect of exposing a fairly stiff clay subsoil. It was suggested by visitors at the time that no crop would be likely to grow on the lower portion of the plot. The first crop sown was Berseem, or Egyptian clover, and the finest growth was secured on the lower portion of the plot, where the subsoil had been exposed; nor in future operations have we ever had reason to regret the exposure of the subsoil.

I do not wish to recommend the removal of the surface soil as a matter of general practice; but when no other means are available, it certainly represents an efficient method of dealing with salt, providing due precautions have been taken to render the action of surface evaporation intense in the preceding summer.

Surface Washing of the Soil and Flooding Without Drainage. The washing of the surface soil of salt land by flooding it heavily has sometimes been advocated, and even practised. It is, however, a very questionable practice, and apart from exceptional cases, likely to do more harm than good. Simply to run flood waters over the land

will not remove salt from it to any great extent; as soon as the water comes in contact with the soil, however rapid its passage, it will tend to sink into the soil to a certain degree; and in doing so the water will carry back into the depths of the soil the great bulk of the surface soluble salts. Hence, in so far as practical results are concerned, the cost of applying flood waters would represent so much waste of money.

If, on the other hand, the flood waters are allowed to stand on the land for any length of time, and to sink into it deeply, the success of their leaching influence will depend on circumstances. place, it may be granted that the lengthy stay of the waters on the land will have the effect, if the soil is at all porous, of driving down surface salts into the depths. Such a treatment would, as a rule, suffice to ensure satisfactory germination of a crop sown immediately after the withdrawal of the waters. But the salt would not necessarily have been removed from the land, and during the course of the season would probably be brought back to the surface by normal If, however, the penetration of the flood waters were sufficiently deep to bring about the removal of the salt into the ordinary country drainage, then the treatment would have been entirely suc-Such a contingency, however, is of exceedingly rare occurrence in land subject to salt; it would imply the existence of natural drainage conditions which, in ordinary circumstances would, by its mere action, prevent any undue accumulation of surface salt.

Hence, under normal conditions, flooding is effective for leaching purposes only when adequate provision has been made for the removal of drainage waters.

HOW TO CONTROL SURFACE EVAPORATION.

Since we know that all irrigated land under arid conditions of climate is liable to the rise of salt, it should be clear that wherever it is possible to take precautions against this contingency, they should be taken. We have seen that this rise of salt is induced exclusively by the intense action of surface evaporation; hence any practices that may have a restraining influence on the intensity of surface evaporation will tend to minimise the evil. Surface evaporation is due primarily to the action of the sun's rays beating on the bare soil, and to the continuous ascent of soil moisture in land that is more or less firm and compact. Hence we should be able to influence surface evaporation (1) by sheltering the soil, or (2) by destroying the capilliary connection between the surface layers of soil and the moister layers below.

It cannot be insisted too strongly that wherever irrigation is practised under arid conditions of climate, the surface layers of soil should,

as much as is possible, be screened from the rays of the sun throughout the summer months. There are various ways in which this can be done, although all are not equally practicable. The land, for example, can be brought under a summer-growing crop, the foliage of which will shelter it from the rays of the sun; this would be the case in a well-grown field of lucerne, or of sorghum, maize, or millet. Trees or shrubs when well grown will also tend to shelter the soil, although not quite as effectively; and, indeed, it is questionable whether, when irrigation is applied, it would not be an advantage, as a matter of general practice, to raise regularly in orchards intercalary screening crops during the summer months.

Meanwhile, where salt is feared, the danger of leaving land bare and exposed to surface evaporation in the autumn months of the year, after a summer crop such as maize or sorghum, may be pointed out. The rise of salt during these few weeks may be sufficient to render the surface layers unfit for the germination of winter-sown crops. Hence, as soon as the screening influence of the crop has been removed, the land should be broken up to a great depth without delay and worked down conscientiously to a fine condition of tilth.

In certain circumstances, too, the soil can be screened from the action of the sun by a thick, strawy mulch. In practice this method is thoroughly effective, but under irrigation conditions generally difficult of application.

Where the land cannot be protected from the action of the sun we must destroy the capilliary connection between the immediate surface layers from which the moisture is evaporated and the moister subjacent layers of the subsoil—in other words, we must screen the moister layers beneath by a thick layer of soil mulch. This is, in effect, the practice of the ordinary farmer who fallows his land; it is, however, of infinitely greater importance to the man who irrigates it. This surface mulch must be of good depth if its protecting influence is going to be at all effective, probably not less than from 5in. to 6in. And at no time should a surface crust be allowed to form over it. If this practice is conscientiously adhered to throughout the months when surface evaporation is to be feared the rise of salt will be very considerably checked.

DEPTH OF TILLAGE.

The depth of tillage usually adopted may not appear to have any particular connection with the rise of salt, nevertheless such is the case to a certain extent. It may be as well to emphasise that, except in those cases where the watertable is very close to the surface, irrigated crops of all kinds call for relatively deep tillage—not less

in the matter of initial preparation of the land than Sin. to 10in. for annual crops, and considerably more for crops that are to occupy the land for any considerable time. If this initial tillage takes place in the autumn months of the year, and concerns annual crops, it presents the advantage of burying to a considerable depth the surface layers in which salt may have accumulated, and renders, therefore, the chances of even germination far more certain.

In so far as trees and shrubs are concerned, deep tillage compels them to develop a greater portion of their root system at a considerable distance from the surface, *i.e.*, at a distance from the layers of soil in which salt normally accumulates under the influence of surface evaporation. At a later period this deep initial tillage enables us to maintain an effectively deep layer of soil mulch both above the moist subsoil layers and the root system of the plant.

MODERATION IN THE USE OF IRRIGATION WATERS.

I have already alluded to the fact that the use of unnecessarily excessive quantities of irrigation water only serves to accentuate the salt trouble; and I need not dwell again at any length on the subject. It will be sufficient to point out that if we wish to avoid salt troubles, water no more than strictly necessary for the requirements of the plant should be used; and this water should be applied preferably in a small number of applications rather than in a number of driblets. Again, in the matter of orchards and vineyards, it is a distinct advantage to apply the water in deep furrows rather than in a number of shallow ones, which would retain the water too close to the surface, where it would be lost very largely by evaporation.

The use of leaky channels for conveying water is also very dangerous, particularly in those localities in which the natural watertable is fairly close to the surface. Seepage from channels of this kind will very readily give rise to the formation of salt patches in their immediate neighborhood, and these in the course of time will extend to a considerable distance.

THE USE OF SUBSTANCE COUNTERACTING THE ACTION OF INJURIOUS SALTS.

It is sometimes thought that when land is affected by salt it is possible to add to the soil substances likely to neutralise the action of injurious salts. This, however, is true only to a very limited extent; it is true of sodium carbonate, but not to any extent of any other salt present. If land is badly affected with sodium carbonate, a dressing of gypsum will have the effect, under the influence of soil

moisture or rain, of converting the sodium carbonate into sodium sulphate, which is far less injurious, and which can be easily leached out of the land by ordinary processes. The quantity of gypsum per acre required would depend, of course, on the amount of sodium carbonate to be destroyed in the surface layers; nor would an attempt to deal in one season with all the sodium carbonate found in several feet of soil, and liable to be brought to the surface, be justified by expediency or by experience. A proportion of 0.1 per cent. of sodium carbonate in the soil is sufficient to hinder healthy vegetation. If we assume that proportion to be present in the first three inches of soil, it would correspond to a total of about 800lbs. of sodium carbonate per acre, which quantity would be all converted into sulphate by a dressing of about 9cwts, of gypsum to the acre. The gypsum should be broadcasted over the surface and allowed to sink into the soil under the influence of rain, or artificially applied water.

Fortunately, however, Australian irrigationists have not hitherto had to contend with black alkali; and the salts we have reason to fear, such as common salt, Epsom salts, Glauber's salt, are not, as a rule, open to chemical treatment. Fortunately, however, they are easily leached out of the land by combined flooding and drainage operations.

In the absence of a sufficiency of lime in the soil, it is true, a dressing of burnt lime may be recommended against an excess of magnesium chloride, which, in the circumstances, might be converted into the innocuous carbonate. This treatment, however, would leave untouched the common salt, which always accompanies the Bittern, and which would have to be leached out of the soil after the liming, which operation would have removed the magnesium chloride at the same time.

CONCLUSION AND SUMMARY.

The facts dealt with in this address can be summarised as follows:—

Present Australian irrigation areas, and in particular those situated on the banks of the Murray, are under the influence of what are known as arid conditions of climate. Experience shows that land so situated becomes exceedingly productive when brought under cultivation and irrigated. Experience throughout the world, however, is equally emphatic in the fact that all such land, when brought under the influence of irrigation, is liable to become salt-impregnated to the extent of barrenness. At times, when first handled, such land shows absolutely no apparent signs of the presence of salt; we have the certainty, however, that salt is present,

but distributed evenly and invisibly through the depth of several feet of soil. A few seasons subsequent to the application of irrigation, however, salt may become apparent either uniformly throughout a block, or in scattered patches which go on increasing in area with time. This salt has risen to the surface, as we have seen, under the call of surface evaporation; and, knowing this, it is our business, as irrigationists, to do everything in our power to hinder the action of surface evaporation and hold in check the rise of salt.

Towards this end our tillage of irrigated areas, when given in the way of initial preparation of the soil, must be deep and thorough, infinitely more so than is the case in the average routine of farming. In addition to this, we must strive by all means possible to keep our surface soil well screened from the direct rays of the sun during the summer months of the year, and where circumstances do not permit of this, we must maintain the moister layers of the subsoil well-protected by a deep layer of soil mulch. Nor should we forget these rules in the autumn, when irrigation areas are bare, in the interval that lies between the removal of the summer crop and the seeding of the winter crop.

We must avoid over-irrigation, leaky water channels, shallow drainage channels, and the slow removal of salt-impregnated drainage waters. It is evident, too, that as much as is possible we must shun irrigation waters which are themselves unduly charged with soluble salts. Let us recollect that irrigation water showing 20 grains of soluble salts to the gallon, and used on the 3 acre feet basis, will bring to the soil annually more than one ton of soluble salts to the acre; 40 grains to the gallon nearly $2\frac{1}{2}$ tons to the acre, and so on. A portion of these salts will no doubt be taken up by the plants; another portion, however, will go towards swelling the existing stocks of injurious salts originally present in the soil.

If in spite of our precautions we are unable to prevent the ultimate rise of salt, or again, if from the outset we are dealing with land evidently over-charged with surface salts, in these cases we must take special steps towards the removal of the salts. And whatever steps we may eventually decide upon, none are likely to prove effective unless we make adequate provision for the systematic removal of drainage waters. Naturally, we shall endeavour to avoid pipe drainage, if circumstances permit of it. Ultimately, however, in many cases we shall have to determine whether the cost of establishing an adequate system of pipe drains is not amply set off by the extremely high productivity of land so treated and irrigated under arid conditions of climate.

If the land shows 0.1 per cent. of sodium carbonate we shall have to treat it with gypsum prior to leaching operations. This, however, is a contingency rare in local experience; in our conditions the floodwaters will pass through the soil, dissolve the soluble salts, and convey them without hindrance through the drain pipes into the country drainage.

The profits to be gathered by individuals from properly conducted irrigation operations under our conditions of climate are enormous; the indirect advantages to the State as a whole are equally great. If, however, in our calculations we are not prepared to take into account this important salt question, and to guard ourselves adequately against it, all our expenditure of time and capital will in the end prove vain, and our irrigation areas will revert to the condition of those of Mesopotamia.

DAIRYING ON THE RIVER MURRAY AREAS.

In a paper read before the Conference of River Murray Branches of the Agricultural Bureau, Mr. G. Lane, of Murray Bridge, said some people considered that any conditions and any sort of stock would do for dairying. That class of farmer, however, lost more by trying to drag along with his stock through the dry part of the year than he made in the green season. The men who adopted dairying exclusively as a means of livelihood required good land, with an adequate rainfall, especially in summer, or a plentiful supply of irrigation water. No conditions were better than those of the reclaimed areas of the Murray. There the staple green fodder was lucerne, but other crops were necessary. For summer crops he recommended maize, first Ninety-day, and secondly Hickory King. For grazing, Egyptian millet could not be beaten; for hay, however, that crop was third rate, and it was only second class as a silage crop. For winter crops, barley held pride of place, wheat second, and oats third.

ENSILAGE.

The writer of the paper referred in no uncertain terms to the value of ensilage. A full silo means a successful and contented farmer,

who can laugh at the dry weather. For stockowners and dairymen the preserving of fodder crops in a convenient form and at a cheap rate spells success. He had proved, in the last few years, beyond question, that ensilage is emphatically the standby for dairy cows. and to be a successful dairyman one cannot be without an ensilage The dry land farmer will find this a cheaper means of cleaning his land from weeds and wild oats, and it will be a sure prevention of impaction and other disorders among his cattle. The same food elements which produce tip-top butter and milk will produce fat and healthy stock. And if ensilage produces good milk from cows it must be equally suitable for sheep and lambs; and this advantage alone would justify the sheep-breeder building an up-to-date silo and growing crops for feeding sheep at lambing time. He had made ensilage in underground pits, stacks, and the overground silo. The first-mentioned two, in emergency, when there was a good deal of rank growth available, would be the means of saving two-thirds of the feed, but they entailed a considerable amount of labor, both in preserving and in cutting out and feeding. The overhead silo was the best system. With a suitable machine, the crop could, with that system, be ensiled at a cost of about 5s. per ton.

THE STAGE AT WHICH TO ENSILE THE CROP.

The crop should be neither too green nor too dry. ready when they turned from the green to the ripening stage; maize should have the cobs well formed and towards hardening of the corn: sorghum when the seeds were firm. Oats, barley, and wheat should be chaffed and ensiled quickly to retain the moisture. The cutting, carting, and filling of the silo should be carried out simultaneously, and the sheaves should not be more than one day old, otherwise there would be waste. One man should be in the pit and should well tramp down the ensilage, especially at the sides. Maize and sorghum were the best material for ensilage, and with them there was not the same necessity for quickness in loading the silo; but nevertheless the sooner the crops intended for ensilage were siloed after being cut in the paddock the better. Reclaimed lands crops did not require salt, but the fodder from the highlands was improved by the addition of 8lbs. of salt to the ton. The class of silo he recommended was round. built of stone or lime concrete, with a good supply of barbed wire built in for binding. It should be 15ft. in diameter, and any height the farmer decided upon. A silo 15ft. in diameter and 15ft. high would hold 50 tons, and would cost about £45 to build. sized silo, constructed of 4in. x 2in. stringybark uprights, 6in. x 1/2in. stringybark bands, and 9in. x 3in. strutted stumps, with 26 gauge plain iron, would cost about the same.

Mangolds.

•When the dairyman had the necessary machinery to handle the crop, mangolds should be grown, as butter produced therefrom was of the highest quality. That crop and swede turnips could be heaped in the manner adopted for road metal, and, covered with straw and earth, would keep for a considerable period. Ten pounds of sliced mangolds and 4lbs, of lucerne chaff mixed made an excellent ration.

THE BREEDS.

The Jersey was the best all-round cow for milk and butter, as animals of that breed were easy to handle and had good udders. The Ayrshire, his second choice, gave a greater quantity than the Jersey, but usually possessed short teats. The Shorthorn gave milk in great quantity, but it produced less butter, and the cow was likely to go off after four months milking. For the milk seller, the Holstein was the best animal, but she required tip-top feeding. He contended that the use of only typical milking strain Jersey bulls on the Ayrshire, Shorthorn, and "scrubber" cows on the reclaimed areas would result in the production of a fine class of milkers. On no account should a crossbred bull be allowed to exist. It was useless trying to grow beef from milking stock, therefore the Jersey bull only should be used.

ACTUAL RESULTS.

In detailing some of the performances of his herd, he mentioned that last year one cow gave a return of 12,050lbs. of milk for nine months; and during the current year, in a little less than five months, 7,010lbs. of milk. The average for the whole herd was well over 6,300lbs. for eight months. Those animals were what were termed "River Murray scrubbers," sired by a Jersey bull. The cow should receive every care and attention; she should be milked at the same time each day, and should receive a feed when being milked. The stalls and manger should be kept clean, and a good ration of ensilage, green lucerne, or chaff, or chaff and mangolds should be provided. The udder and teats should be wiped with a damp cloth, and should not be chilled with cold water, but should be dried before the cow was turned out.

TREATMENT OF HEIFERS.

Heifers coming in should be treated with every kindness, and coaxed to the bail. The first fortnight's schooling would always show itself afterwards, in the years of the animal's usefulness. On no account should they be dried off until at least eight months from the date of the last calving; indeed, it was beneficial to milk them a full nine months, or within six weeks of the second calving. It

rested with the dairyman whether he made a profitable milking machine of his heifers, or ordinary cows that gave a flush for four months, then dried off, and became fit meat for the butcher.

POINTS OF GENERAL INTEREST.

Whilst machine milking had much in its favor with extra clean individuals, he had yet to be convinced that as a rule it had much advantage over hand milking. It was a mistake to give calves skim milk too soon. When the mother's milk was discontinued, the calf should at first receive half ordinary and half separated milk. A fresh egg, beaten up and mixed with the feed would be repaid in the value of the calf. To ensure success, either in milk or butter selling, the animal heat should be got out of the fluid at the earliest possible moment.

THE FUTURE OF IRRIGATION ON THE MURRAY IN SOUTH AUSTRALIA.

At the recent Conference of Murray River Branches, a paper under the above title was contributed by Mr. F. H. Basey, President of the Renmark Branch. Whilst irrigation was successfully practised in Egypt and India, he said, the conditions there were so different from those of South Australia that their successes were no guide for this State. Nevertheless, experiments in hemp and cotton growing would be of considerable interest. The case of California, however, where the main lines of cultivation were fruit, lucerne, and sugar beet, provided valuable lessons for this State.

SOUTH AUSTRALIAN DEVELOPMENTS.

The irrigation areas of South Australia had mainly developed on the lines of fruitgrowing, which had been narrowed down almost entirely to the production of dried fruit, a direction largely determined by difficulties of transit. Granted satisfactory transport facilities, there was nothing to prevent the irrigation settlements supplying the Australasian markets with high grade fruit at reasonable prices. Cold storage was also making it possible to export fresh

fruits, a line of development that was of the utmost importance. Washington Navel oranges had already been successfully placed on the London market, and small shipments of pears had been sufficiently successful to justify the hope that with improved railway facilities. the River offered a field second to none for the establishment of a large export trade. Shipments of Chanez grapes to London also opened up great possibilities.

EXPANSION OF THE DRIED FRUITS INDUSTRY.

The expansion of the dried fruits industry depended on the popularising of the fruit as an article of diet for Australians and the opening of export markets. The production in 1916 he estimated at 16,000 tons, and the local consumption S,000 tons. In this connection he referred at length to the activities of the Australian Dried Druits Association. The future of the dried fruits industry, he said, would depend upon the good working of that association of growers.

Sufficient was known to give assurance that there was a bright future before fodder growing, mixed farming, dairying, pig and lamb raising, and poultry keeping. The growth of sugar beet was one of the last lines of development under irrigation, and even more so than hemp and cotton, it was a line necessarily of broad acres.

THE NEEDS OF THE FUTURE.

In order that irrigation should be carried in this State to the high standard of achievement in California, enterprise, forethought, and co-operation were necessary, both on the part of administrators and of individual growers. The Government should use its opportunities of broad outlook to indicate as far as possible the lines of desirable development. The necessity for improved railway facilities, the need for the establishment of a type orchard, and experimental demonstration stations for dairying, lamb and pig raising, and poultry keeping were referred to. The line of development on the Mypolonga area providing for the mixed irrigation farm, commended itself as a sound policy. They were justified in feeling optimistic; broadly speaking, the irrigation areas were attracting a good type of settler. The development of the Murray, and particularly its irrigation possibilities, had eaught the imagination of South Australians, and the question had been treated as a national one.

From the Agricultural Bureau should emanate suggestions and healthy criticism for the benefit of all concerned with the development and extension of irrigation. It was therefore desirable that the Bureaux should be representative of the settlers.

THE SCHOOL GARDEN.

The Dominion of Canada has given a good deal of practical consideration to the promotion of agricultural education by means of school gardens, and in quite a large number of the public schools agricultural training forms a regular part of the curriculum.

The primary aim of the school garden, it has been pointed out, is not to grow grains, flowers, or vegetables. It is to furnish incentive and provide a field of work, that will be rich educationally in recreative, instructional, and character-forming experiences.

The ultimate test of the value of activities such as this is whether the scholar who has the benefit of this training is thereby better fitted for his life work, and it is interesting to record that Mr. S. B. Sinclair, speaking at a meeting of the Ontario Education Association at Toronto, is reported to have said:—

"The most potent remedy for social and economic unrest is scientific, co-operative, intensive farming, and the most natural and effective preparation for intensive agriculture is the school garden, the city backyard home garden, the boy farmer club for placing city boys on the farm during summer vacation, and other agricultural activities administered by school authorities and correlated with school work."

South Australia, with its dependence on agricultural resources, can afford to lose no opportunity of increasing, not only the number of its agriculturists, but their efficiency.

The adoption of the "school garden" idea would seem, therefore, to be a step in the right direction, and it is interesting to note that teachers in some of the South Australian schools are interesting the children under their charge in gardening and horticultural pursuits.

The accompanying illustrations show scholars engaged in the school garden at Murray Bridge, under the guidance of Mr. A. R. Hilton, B.A.



Murray Bridge High School—Boys at Work in the Swamp Garden, showing Onion and Potato Plots.



Murray Bridge School Garden—Showing Girls' Flower Plots and Boys' Vegetable Garden.

EXPERIMENTAL FARM HARVEST REPORTS.

By W. J. Spafford, Superintendent Experimental Work.

3.—TURRETFIELD EXPERIMENTAL FARM.

Manager: Mr. G. H. Stevens.

This farm is situated in the hundreds of Nuriootpa and Barossa, about 30 miles north of Adelaide, and has an area of 1,573 acres. The North Para River passes through the property, and is joined in its course through the same by Salt Creek. The majority of the land is rather steeply undulating, but with the exception of about 150 acres can all be put under cultivation.

THE SEASON 1915.

The year opened in this district, like it did in most parts of the State, with very little rain for the first three months—less than half an inch in January, one point in February, and 19 points in March, a total of 66 points as against an eight years' average of 2.61in. for the period. This is very little rain, but for ordinary farming operations other than the cleaning of the fallow none is necessary during these months. April registered 1.33in. of raina nice amount to germinate the weeds before the bulk of seeding operations. and enough for a good start for the later varieties of the cereals. The remainder of the seeding period—May—was blessed with 3.61in. of rain, as against an average of 2.50in. June also received 33in. as against barely 2in. for the average, but the July fall was considerably below the average, being 15in. instead of over 21in. During August about the average fall was collected, but September showed nearly 5in. when the average for that month is but 2.64in. October falls only reached 1in. instead of a little over 1 in., and the last two months—November and December—were both considerably below the farm averages. The following table sets out in detail the monthly rainfall at Turretfield since 1908, with totals, means, and total " useful " rain :--

Rainfall Distribution at Turretfield, 1908-1915.

]	10 2000 2				1				1
	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	Means, 1908-15.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0.55	0.59	1.69				0.21	0.46	0.44
February	0.28	0.71		1.34	0.69	3.12	1.12	0.01	0.91
March	1.12	0.49	3.83	0.97	0.50	2.32	0.62	0.19	1.26
April	0-47	2.46	0.08	0.35	1.07	0.25	2.06	1.33	1.01
May	3.76	3.85	4.57	2.16	0.20	0.54	1.30	3.61	2.50
June	1.83	2.22	2.41	2.54	2.00	0.12	0.38	3.76	1.91
July	1.19	3.97	3.42	1.99	3.14	1.53	1.49	1.57	2.29
August	1.69	5.00	1.61	0.86	3.02	1.71	0.31	1.91	2.02
September	3.12	1.26	3.12	1.88	3.63	2.81	0.43	4.90	2.64
October	2.91	2.10	2.98	0.56	1.09	2.39	0.09	1.00	1.64
November		2.39	0.87		1.66	1.10	1.41	0.17	0.95
December	0.26	0.33	1.84	1.53	_	0.88	0.55	0.23	0.70
Total Total " useful " rain	17.18	25.37	26.42	14-18	17.00	16.77	9.97	19-14	18.25
(April to November)	14-97	23.25	19-06	10-34	15.81	10.45	7-47	18.25	14.95

DISTRIBUTION OF "USEFUL" RAINFALL.

Following the practice of this department, the rainfall for the season will be shown arranged as it appears to affect crop growth. In this arrangement the rains falling some time before seeding operations and when the crops are approaching ripening are taken as being non-essential to the production of good crops, and in no way influencing their growth to any great extent. It is not only the rain that falls between April and November—the period taken as giving the essential rains—that regulates the crops, but rather the distribution of that rain. The following table shows the "useful" rainfall arranged as seeding, winter, spring, and early summer rains, and a glance at it will serve to show every reason for good bulky crops, for the seeding rains were good, followed by good winter rains, and these again by an excellent spring fall. The early summer rains were light, but after such good spring rains they were not so necessary. These rains should have produced a record crop, and on appearances a short time before harvest it looked like it, but red rust and the "blighting off" of patches on the low-lying spots very considerably lowered the estimate of the yields.

Distribution of the "Useful" Rain in 1915 Comparatively with the Means from 1908-1915.

		Means.
	1915.	1908-1915.
	Inches.	Inches.
Seeding rains (April-May)	4.94	3.51
Winter rains (June-July)	5.33	4.20
Spring rains (August-October)	7.81	6.30
Early summer rains (November)	0.17	0.95
Total "useful "rain	18.25	14.96

CROPS.

The only crops sown this year consisted of the cereals wheat, cats, and barley, and in all cases, except where grown for green feed, were sown on fallowed land. The fallow in all cases was well worked throughout the year, and the timely autumn rains germinated the weeds well, so that most of the seed was put into well-worked clean land.

Green Forage Crops.—As soon as the soil would permit of it, two fields—Dost's (about three acres in extent) and the Bull Field (about six and a half acres)—were ploughed and cultivated down to a fine tilth. On March 27th a mixture of Algerian oats and Cape barley, at the rate of a bushel of each to the acre, was drilled into Dost's Field, and on April 14th a similar mixture was drilled into the Bull Field. These crops did splendidly, and in spite of the enormous quantity of natural feed on the farm, were a great help to both the dairy herd and the ewes and lambs.

Ensilage Crops.—The Engine Shed Field consists of about seven and a half acres of land that was originally under lucerne, but of late years had produced no crop, due to the rise of injurious salts. This land was ploughed in the autumn and worked down immediately. Algerian oats were drilled in at the rate of $1\frac{1}{2}$ bush, to the acre on five acres on April 16th, and the remaining two and a half acres were seeded to Cape barley on the same day at the rate of 1bush, to the acre. Both of these crops made good growth, but having no weighbridge the actual produce is not known—from the seven and a half acres 50 waggon loads were carted and chaffed into the silo.

Hay Crops.—Very little crop was sown for hay alone this year, as we were prepared to cut very wide headlands from the fields carrying varieties. This arrangement worked very well, and we were not compelled to sacrifice any of our grain crops, due to the fact that a self-sown crop produced a large quantity of good hay. The total area cut for hay, including the self-sown crop mentioned, was 75·26 acres, and this produced 252 tons (by stack measurement), or an average yield of 3 tons 6cwts. 108lbs. per acre.

Hay Returns, Turretfield, 1913-1915.

Year.		" Useful " Rainfall.						eld p Acre	
	Inches.	Inches.	Acres.	T.	c.	L.	T.	C.	L.
1913	9.97	10.45 7.47 18.25		175	0	Ö	ō	16	14
Means	15-29	12-06					1	18	3

Out Crops.—No very large area of outs was sown this year, and it was all drilled in to fallowed land at the rate of 1½ bush. of seed with about 2cwts. of superphosphate to the acre. On April 13th about one acre of Moster's Field was sown with Champion outs, on April 19th about 15 acres of Field M13 was drilled in with Calcutta outs, and on the 29th of April about six acres of Field L10 was seeded with Burpee Welcome outs.

Oat Varieties at Turretfield, 1915.

•				$v_{i\epsilon}$		
Variety.	Area.					
	Acres.	Bush	. Ibs.	Bush	. lbs.	
Calcutta	14.76	~	-	32		
Stout White	0.87	23	24	27	5	
Burpee Welcome	5.86	73	10	12	20	_
Total	21.49	576	3	26	23	

Besides the above varieties the 5.01 acres of Algerian oats cut for ensilage were allowed to come to head on the second growth, and produced 35bush. 15lbs., or 7bush. 2lbs. to the acre.

Barley Crops.—The only barley crops grown have already been mentioned as for green feed and for ensilage, and none was harvested for grain.

Wheat Crops.—Although the season 1914-1915 was such an exceptionally unfavorable year for wheat, in no case did this farm have a total failure, and so the varieties that have been tested for the last few years could all be continued. All wheat sown, except a small area for hay, was drilled on to fallow land. Field H12 was cultivated in early April and seeding was commenced on the 20th of that month and concluded on the 28th, having had the following varieties drilled in with 2cwts. of superphosphate per acre:—Lott's, American No. 8, Crossbred 53, Yandilla King, Marshall's No. 3.

Field L10 was the next to receive attention and was sown from April 30th to May 6th with the following wheats, each getting about 192lbs. superphosphate to the acre:—Correll's No. 7, Federation, Genoa, Triumph, Le Huguenot, White Essex, Bayah.

Field N14 followed this with another batch of varieties, receiving about 200lbs. superphosphate to the acre; the first one going in on May 12th, and the field being completed on the 29th, in the following order:—Cumberland, King's Red, Firbank, King's White, King's Early.

Field F8 only carried two varieties—King's Early and Firbank—both of them drilled on the one day, May 22nd, with 200lbs. superphosphate per

acre.

Field O15 was sown on May 24th to King's White wheat with 200lbs.

superphosphate per acre.

In field D6, two and a half acres of Comeback were sown on May 7th and then the field was left until May 29th, when the following varieties were sown with 200lbs. superphosphate to the acre, completing the field on May 31st:—Cedar, Red Russian, Marquis, Bunyip, Thew, Queen Fan, Gluyas, Turretfield Eclipse, Leak's Rustproof.

The following table sets out in detail the yields of these several varieties :--

Wheat Varieties, Turretfield,	1915.				
		To	tal	Yi	eld
Variety.	Area.	Yie	eld.	per .	Acre.
•	Acres.	Bush	. lbs.	Bush	lbs.
Turretfield Eclipse	0.37	11	40	31	32
Queen Fan	2.09	65	30	31	20
Leak's Rustproof	0.56	17	12	30	43
Gluyas	13.47	393	7	29	11
Thew	2.68	72	38	27	6
Le Huguenot	$12 \cdot 36$	316	31	25	36
Red Russian	0.84	19	7	22	45
Cedar	0.70	15	47	22	33
King's Early	7.21	159	43	22	9
Marquis	2.64	57	56	21	57
Comeback	2.10	41	46	19	53
Bayah	5.55	106	50	19	15
Bunyip	1.68	29	44	17	42
Yandilla King	43.65	753	32	17	16
White Essex	2.47	42	7	17	3
King's White	6-20	98	37	15	54
Crossbred 53	19.14	301	53	15	46
King's Red	6.05	90	6	14	54
Federation	14-55	211	37	14	33
Cumberland	1.86	26	43	14	22
Marshall's No. 3	49.08	642	8	13	5
Correll's No. 7	12.05	153	3	12	43
Triumph	13.78	170	14	12	21
American No. 8	13.17	157	21	11	57
Firbank	9.78	116	30	11	55
Genoa	8.31	96	51	11	39
Lott's	19-92	173	46	8	43
Gluyas (Exp.)	0.99	28	58	29	16
King's Early (Exp.)	3.81	80	38	21	10
-					
Total	277.06	4,451	35	16	4

Of the varieties that have given yields much above the average for the farm the first two are new wheats, i.e., Turretfield Eclipse and Queen Fan. The former of these is a selection from Federation made by Mr. Stevens, the manager of the farm. The area this year is rather small to be much of a criterion, but if Mr. Stevens can keep it true to type it promises to outclass Federation in these special conditions. Queen Fan is a product of Roseworthy Agricultural College, and has a good record for this season. At Booborowie

Experimental Farm it was top yielder, with over 35 bush, per acre; at Kybybolite Experimental Farm it was the highest yielder for all wheats covering an acre or more; it yielded well at Roseworthy Agricultural College, and Mr. W. R. Richardson, of Koppio, considers it the best wheat that he has grown. The next on the list—Leak's Rustproof—is a one-time popular wheat just coming into favor again; it is a really good hay wheat, and in most conditions a fair grain wheat. Gluyas, of course, is well known and has just shown once again its ability to yield well under almost any conditions. Thew is a variety that has been grown for some years now in this State, but can hardly be termed a consistent yielder. Le Huguenot is rather a surprise, as it is essentially a hay wheat. Red Russian is a hardy wheat with poor quality grain. Cedar is a wheat that of late years has taken the championship prizes for best milling wheat in the other States. Marquis is a new wheat to this country, being of Canadian origin, where it is spoken of as "our best spring wheat."

The following table shows the wheat yields for this farm since 1912, and the average yield for the four years:—

Wheat Returns, Turretfield, 1912-1915.

Year.	Total Rainfall. Inches.	" Useful" Rainfall. Inches.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1912	$16.77 \\ 9.97$	15·81 10·45 7·47 18·25	280·17 185·83 142·75 277·06	5,687 27 3,159 17 811 30	20 18
Means	15.72	12.99			14 46

The yields of each individual variety have been kept at the farm since 1912, and the following table sets out the yearly yield, and the average of all varieties that have been grown for each of the last four years:—

Yields of Varieties of Wheats, Turretfield, 1912-1915.

									Mean	as for
Variety.	1912.		19	1913.		1914.		1915.		Years
	Incl		Inches.		Inches.		Inches.		Inches.	
Total Rainfall	17	00	16	77	9.	97	19.	14	15	72
"Useful" Rainfall	15	81	10	45	7.	47	18-	25	12.99	
	Bush	. 1bs.	Bush	. lbs.	Bush	. lbs.	Bush	. lbs.	Bush	. Ibs.
Gluyas	18	14	21	31	12	46	29	11	20	25
Le Huguenot	23	40	16	58	4	35	25	36	17	42
Comeback	17	47	23	15	5	45	19	53	16	40
Thew	13	20	17	5	7	12	27	6	16	11
King's Early	21	18	8	51	12	8	22	9	16	6
Yandilla King	24	41	16	58	3	26	17	16	15	35
Bunyip	20	12	12	48	8	40	17	42	14	50
Firbank	22	21	11	37	11	32	īi	55	$\tilde{14}$	21
Genoa	22	0	21	14	2	18	11	39	14	18
Correll's No. 7	18	28	15	14	6	14	12	43	13	10
American No. 8	14	48	16	53	7	7	11	57	12	41
Bayah	13	36	11	49	5	41	19	15	12	35
Farm average	20	18	17	0	5	41	16	4	14	46

A fair number of wheats other than the ones shown in the above table have been grown continuously for the last three years, so a table on the plan of the last one for these years will prove of interest.

Yields of Varieties of Wheats, Turretfield, 1913-1915.

			•				Mean	s for
Variety.	19:	3.	191	4.	191	.5. '	Three Y	Tears.
	Incl	ıes.	Inch	les.	Inch	ies.	Inel	ies.
Total rainfall	16	-77	9.	97	19	14	15	29
"Useful" rainfall		-45	7.	47	18.	25	$12 \cdot$	06
	Bush		Bush.	lbs.	Bush.	$_{ m lbs}$. Bush.	. Ibs.
Gluyas	21	31	12	46	29	11	21	9
Thew	17	õ	7	12	27	6	17	8
Comeback	23	15	5	45	19	53	16	18
Le Huguenot	16	58	4	35	25	36	15	43
King's Early	8	51	12	8	22	9	14	23
Crossbred 53	26	42	1	40	15	46	14	23
King's White	14	44	12	15	15	54	14	18
Triumph	23	4	7	25	12	21	14	17
King's Red	16	44	10	41	14	54	14	6
Lott's	19	27	13	10	8	43	13	47
Marshall's No. 3	20	33	7	0	13	5	13	33
Bunyip	12	48	8	40	17	42	13	3
Yandilla King	16	58	3	26	17	16	12	33
Bayah	11	49	5	41	19	15	12	15
American No. 8	16	53	7	7	11	57	11	59
Genoa		14	2	18	11	39	11	44
Firbank	11	37	11	32	11	55	11	41
Correll's No. 7	15	14	6	14	12	43	11	24
Cumberland	11	52	7	53	14	22	11	22
Farm average	17	0	5	41	16	4	12	54

EXPERIMENTAL PLOTS.

Permanent experimental plots had not been established on this farm previously to this year, and the tests that have been conducted have varied from year to year, so that the results cannot be tabled together. The fields selected for experimental plots were not under bare fallow, with the exception of a small part, so the first results from these cannot be recorded until next year. The small portion under fallow comes in the Rotation Plots Field, and a start was made by sowing the plots to wheat with 2cwts. of superphosphate; these yielded as follows:—Plot 41, 18bush.; Plot 44, 21bush. 57lbs.; Plot 47, 21bush. 44lbs.

The only other manurial experiment consisted in the treating of wheat with radio-active ore, in a fine state of division, from Mount Painter. This ore shows on analysis—

	Per cent.
Water at 100° C. (H ₂ O)	. 0.37
Water above 100° C. (H ₂ O)	. 2.53
Silica (SiO ₂)	
Alumina ($\hat{A}l_2O_3$)	
Ferric oxide (Fe ₂ O ₃)	
Lime (CaO)	
Magnesia (MgO)	
Soda (NagO)	
Potash (K ₂ O)	
Manganese dioxide (MnO ₂)	
Uranium trioxide (ÜO ₃)	
Barium oxide (BaÒ)	0.64
Copper oxide (CuO)	
Zinc oxide (ZnO)	
Titanium dioxide (TiO ₂)	
Phosphoric anhydride (P ₂ O ₅)	
Sulphuric anhydride (SO ₃)	

99-90

The plots testing this ore each consisted of 0.33 acre of Gluyas wheat, and the results were as follows:—

Plot 1, receiving 1cwt. superphosphate to the acre, yielded 32bush. 19lbs. per acre.

Plot 2, receiving 1cwt. superphosphate and 100lbs. radio-active ore per acre, produced 30bush. 27lbs. to the acre.

Plot 3, receiving only 100lbs. radio-active ore to the acre, produced 25bush. per acre.

4.—KYBYBOLITE EXPERIMENTAL FARM.

Manager: Mr. L. S. Davie.

This farm is situated in the hundred of Binnum, in the South-East of the State, and comprises 1,000 acres of land immediately surrounding the homestead of the old Kybybolite sheep station. The land is more or less undulating, and is all arable: the great bulk of it contains a very large proportion of ironstone rubble with its corresponding crop-raising difficulties, and the remaining portion is heavy-working "crabhole" land.

THE SEASON, 1915.

The year started off with more rain than the average for both January and February, but falls during these months are of very little use for the cereals. During March, when rains are useful, and indeed in these conditions are more or less necessary to fit the land for cultivation, very little rain fell-only 42 points, as against an average of 152 points for this month. This lack of rain delayed the preparation of the land so much that the last of the wheat was not sown until June 15th. April also was below the average by nearly half an inch, and May was almost 3in. lower than the average of 2.52in. June made up for the deficiency of the three previous months by registering 6.55in., as against 3.14in. for the last 10 years. Of this 51in. fell in the last fortnight, with the result that the land, which is very subject to waterlogging on practically the whole of this farm, and indeed the whole of the district, was absolutely flooded. This flooding led to the drowning of much of the crops and to the abundant growth of water grass (Juncus bufonius), which did its share of retarding crop growth; it also delayed the seeding of the cereals barley and rye, and the last of the barley was not in until July 17th. July was comparatively dry, only 1.68in. falling with the average for this month at 3.13in. This certainly gave the soil a chance to dry, but it was a bit too dry, and the surface caked hard. Both August and September were very wet, each month being about 11in. above the average. remainder of the season set in dry—just when rains were needed to finish off crops that had been through a severe time. October was 60 points below the average; November 1in. below, and December only produced 11 points instead of 1.22in. The total fall was practically exactly the same as the average for the last 10 years, but its distribution was not good. The following table sets out in detail the rainfall for the last 10 years at this farm.

Rainfall Distribution at Kybybolite, 1906-1915.

		-					-				
	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	Means 1906-15
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0.15	0.27	0.13	0.76	0.15	0.71	_	0.30	0.72	0.54	0.37
February	0.45	1.46	0.70	0.62	0.24	2.61	0.14	1.77	0.15	1-15	0.93
March	1-65	0.63	1.76	1-79	4.68	0.85	0.72	1.38	1.37	0.42	1.52
April	0.60	3.98	0.58	2.47	0.87	1-11	1.51	0.80	1.98	1-12	1.50
May	4.00	2.73	3.54	3.24	3.75	2.53	0.83	0.83	1.98	1.82	2.52
June	5.35	1.55	3.64	4.53	2.38	3.75	2.64	0.32	0.65	6.55	D·14
July	9.35	3.79	1.06	2.72	3.82	2.68	2.54	I-94	1.69	1-68	3.13
August	3.50	3.50	1.85	4.55	1.86	2.08	1.81	3.08	0.33	4-11	2.67
September	3.55	1.21	3.31	2.05	4.11	1.78	5.83	3.03	0.47	4-18	2.95
October	2.50	1.29	3.05	3.51	2.45	0.79	1.10	1.95	0.18	1.20	1.80
November	4.21	1.93	0.73	1.15	1.84	_	1.97	1.98	1.15	0.52	1.55
December	0.76	0.73	0.52	0-47	2.20	3-34	1.74	1.06	1.27	0-11	1.22
			<u> </u>		ļ	; 					
	36.07	23 07	20.87	27.86	28.25	22.23	20.83	18-44	11-94	23-02	23.80
Total "useful" rain (April-November)	33-06	19-98	17-76	24.22	21.08	14.72	18-23	13-93	8-43	21-18	19-26

This shows the "useful" rainfall to have been 21.18in., an improvement of almost 2in.; but, as has often been pointed out in reports of this department, it is not so much the quantity of rain that falls as the distribution of it; and it even goes one step further and depends on the distribution of the "useful" rain rather than on the total quantity of "useful" rain.

DISTRIBUTION OF "USEFUL" RAINFALL.

The autumn or seeding rains in a district like the one in which this farm is situated are of great importance, as much of the land to be cropped has to be ploughed and worked down. These rains (April-May) were comparatively low this year, being more than an inch below the average. This considerably delayed seeding operations, and as the winter rains (June-July) were heavy, being 2in. above average, many of the crops were not far enough advanced to withstand so much wet. Spring rains (August-October) were also 2in. above the average for the same period, which would have been very suitable if the early summer rains (November) had kept up to the average. The table following shows the distribution of these "useful" rains, with the average falls for the last 10 years.

Distribution of "Useful" Rain in 1915 comparatively with the Means from 1906 to 1915.

		Means.
	1915.	1906-1915.
	Inches.	Inches.
Seeding rains (April-May)	2.94	4.02
Winter rains (June-July)	8.23	6.27
Spring rains (August-October)	9.49	7.42
Early summer rains (November)	0.52	1.55
Total "useful" rains	21.18	19.26

CROPS.

The climate at this district admits of a big variety of crops being grown, and full advantage is taken of this. Green forage crops are put in during the autumn: these are followed by the cereals oats, wheat, rye, and barley, then peas, and in the spring a big assortment of summer growing crops.

Green Forage Crops.—Field No. 11 was ploughed and worked down during February, and the six acres comprising the field were seeded with rye at the rate of 1 bush. to the acre. Field No. 2, 17 acres in extent, was then cultivated and seeded as above. Then field No. 14 was worked and also sown to rye. This field is 40 acres in extent, making a total of 63 acres sown to rye. Field No. 11 was seeded during the first week in March, and the other two fields in the first week of April. All fields had been fed off for the first time by the end of May, and the second feeding was started with field No. 11 right at the beginning of June; No. 2 before the middle of the month; and No. 14 followed. Fields No. 2 and No. 14 were needed for summer crops, so were kept fed fairly close until September, when they were ploughed up. Field No. 11 produced feed close up to harvest time.

Hay Crops.—Algerian oats was the only cereal sown exclusively for hay, and of this 79 acres of fields No. 20 and what was No. 13, but is now part of the Permanent Manurial Experimental Field, were sown at the rate of 1½ bush. with 1cwt. superphosphate to the acre. The remainder of the hay harvested consisted of headlands of the grain crops and some Dart's Imperial wheat that was too badly affected with red rust to leave for grain.

Outen Hay.—Fields Nos. 20 and 13 were spring fallowed, and were worked down to very fair condition by seeding time. At seeding the whole of this 79 acres was also seeded with fodders for use in the coming year. These consisted of 20 acres lucerne, at 10lbs. to the acre; 20 acres perennial red clover, at 10lbs. per acre; 19 acres red clover, at 10lbs. per acre; 10 acres perennial rye grass, at 20lbs. per acre; and 10 acres Western Wolth's rye grass, at 20lbs. per acre. Of these fodders the clovers and the lucerne did very poorly, presumably because of the severe flooding in June and the lack of summer rains; but these very conditions that were unfavorable to the above suited both the rye grasses, which did remarkably well. On a block of new land of about 15 acres, more or less covered with crabboles, the hay cut was almost pure rye grass, and the stubble feed was wonderful. oaten hay yielded from an area of 78.83 acres a total of 83 tons 14cwts., or 1 ton 1cwt. 26lbs. to the acre. Wide headlands were cut for hay in field No. 10A carrying Algerian and Calcutta oats for grain, and from 10.44 acres cut for hay 7 tons 4cwts. 28lbs. were obtained, or a yield of 13cwts. 92lbs. to the acre.

Wheaten Hay.—No wheat was sown for hay alone, but the crop of Dart's Imperial was so rusty that 10.61 acres was cut with the binder. This produced 15 tons 5cwts. 84lbs., or a yield of 1 ton 8cwts. 92lbs. to the acre. The wheat headlands in field No. 10B produced 1 ton 1cwt. from 2.26 acres, or at the rate of 9cwts. 33lbs. to the acre. The headlands of field No. 11 were a mixture of wheat, rye, and barley, and 4 tons 9cwt. 56lbs. were cut from 6.52 acres, yielding 13cwts. 81lbs. to the acre. The following table sets out the hay yields for the year together with the farm average:—

Hay Yields-Kybyboli'e, 1915.

Crop.	Field Grown, No.	Area. Acres.			ield. L.			
Algerian oats	20 and 13	78.83	83	14	0	1	1	26
Oats headlands	10 A	10.44	7	4	28	0	13	92
Dart's Imperial wheat	5	10-61	15	5	84	1	8	92
Wheat headlands	10 в	2.26	1	1	0	-0	9	33
Wheat, barley, and rye	11	6.52	4	9	56	0	13	81
Farm average	-	108-66	111	14	56	l	0	65

The table set out below gives the hay returns at this farm since 1910, with the general average for the period:—

Hay Returns-Kybybolite, 1910-1915.

Year.	Total Rainfall. Inches.	" Useful " Rainfall. Inches.	Area. Acres.			ield. L.			
1910	28.35	21.08	106-13	88	19	28	0	16	85
1911	$22 \cdot 23$	14.72	94-04	136	6	110	1	9	28
1912	20.83	18.23	26.59	67	7	70	2	10	76
1913	18.44	13.93	108.55	166	11	0	1	10	77
1914	11.94	8-43	109.00	90	1	0	0	16	59
1915	23.32	21.18	108.66	111	14	56	1	0	65
Means	20.85	16.26					1	7	46

Oat Crops.—A number of varieties of oats were sown this year for grain, most of which only occupied a small area, and, unfortunately, all of these small varieties were grown in field No. 10B, a low-lying field that has never given satisfactory yields in wet years. The larger blocks were placed more advantageously in fields Nos. 6A and 10A, but still the wetness of June, followed by the caking of the surface and the strong growth of Juncus, kept the yield

low. The following table setting forth the variety yields includes an experimental block. This is the cultivation plots, details of which will be shown later:—

Oat Variet	y Yields—	Kybybolite,	, 1915.					
		Field		Tota	al	Υic	eld	
Variety.	Selection.	Grown.	Area.	Yiel	d.	per 1	Acre.	
· ·			Acres.	Bush.	lbs.	Bush	. 1bs.	
Calcutta		10 A	6.48	144	32	22	14	
Algerian		6A	28.34	559	23	19	30	
Algerian		10 A	36.30	439	26	12	4	
Calcutta	1	10 B	1.25	7	39	6	15	
('lydesdale	1	10 в	0.19	U	27	3	22	
Ruakura		10 E	0.20	0	23	2	35	
White Liggowo	1	10 B	0.05	0	5	2	20	
Goldfinder	. 1	10 B	0.60	1	4	1	33	
Wideawake	. 1	10 в	0.20	0	14	1	30	
Welcome	1	10 B	0.36	0	21	1	18	
Peerless White Wonder	. 1	10 в	0.21	0	11	1	12	
Royal Cluster	. 1	10в	0.36	0	11	0	31	
Algerian (Exp.)			5.20	95	29	18	16	
Farm average			79.74	1 251	25	15	28	

The table following shows the yields of oats obtained at this farm since 1910, with the farm average for the six years:—

	Oat Reta	urns—Ky	bybolite, 19	10-1915.					
		Total	"Useful"		Tota	al	Yie	eld	
	Year.	Rainfall.	Rainfall.	Area.	Yiel	d.	per A	Acre.	
		Inches.	Inches.	Actes,	Bush.	lbs.	Bush	. 11s.	
1910		28.35	21.08	77.00	1,001	0	13	0	
1911		22.23	14.72	60.91	828	13	13	24	
1912		20.83	18.23	103.00	3.450	36	. 33	20	
1913		18.44	13.93	94.55	1,460	10	15	18	
1914		11.94	8.43	6.00	61	3	10	7	
1915		23.32	21.18	79.74	1,251	25	15	28	
7	Tagne	20.85	18.98				16	36	-

Barley Crops.—The seeding of the barley crops was delayed by the very heavy rains in June, and none of the seed was in the ground until July, the last of it being in on July 17th. Even this seeding would not have been too late if rains had come in summer, as until that time the crops grew well and gave promise of good yields. Field No. 11 was fallowed land, and in this the two malting barleys Duckbill and Prior were grown, and also the two six-rowed varieties Short Head and Oregon. Field No. 7, which carried ordinary Cape barley, had been out a year, and was ploughed and worked down in June immediately before the drill. All barleys were grown with 1cwt. superphosphate to the acre. Below is shown the yields of the various varieties grown and the farm average for the year:—

Barley Variety Yields—Kybybolite, 1915. Field Total Yield Varie'v. Grown. Yield. per Acre. Area. No. Acres. Bush, lbs. Bush. lbs. 7 43.36735 1216 48 Oregon 2.6711 323 12 0 Duckbill..... 0.513 21 11 6 35 0.472 37 11 5 41 Short Head 3.2716 16 5 0 Farm average 50.2878939 15 35

In the following table will be seen the yields of barley obtained at Kybybolite since 1910, with the farm average for the period:—

Barleu	Returns-	Kubi	vbolite.	1910-1915.
	2000000		, oouter,	TOTO TOTO.

Year.	Total Rainfall. Inches.	" Useful " Rainfall Inches.	Area. Acres.	Tota Yield Bush	d.		Acre.
1910	28.35	21.08	45.39	299	29	6	20
1911	22.23	14.72	58-76	552	16	9	20
1912	20.83	18-23	50-60	1,500	()	50	()
1913	18-44	13.93	35-00	527	0	15	3
1914	11.94	8.43	3.02	37	48	12	29
1915	23.32	21.18	50.28	789	39	15	25
Means	20.85	16.26	-	-		14	4.5

Rye Crops.—Some rye is always grown on the farm, as there is a small demand for seed, and it is our usual practice to grow rye and oats for green feed, and we raise our own seed for this purpose. Field No. 11 carried what rye was produced this year on the homestead farm, and the table below shows the yields obtained from the varieties tested:—

Rye Variety Yields-Kybybolite, 1915.

Variety.	Area. Aeres.	Yie	eld.	Yie per A Bush	Acre.	
Rye	4.54	33	20	7	21	
Schlanstedt	1.17	6	53	5	53	
Multicaule	0.63	3	20	5	17	
Giant Winter	0.93	4	41	õ	2	
Farm average	7.27	48	14	6	28	

Wheat Crops.—A large number of varieties of wheats was again sown on this farm, but as the total area of wheat harvested was only 80 acres there was no large area of any one variety. The smallness of the plots is inevitable in country dissimilar to known conditions, as one of the first problems to be solved anywhere is the suitability of varieties; and the small total area is accounted for by the fact that a big variety of crops are grown in place of the usual South Australian practice of wheat being the principal crop or even of wheat being the only crop.

Field No. 10B carried the smallest plots and all of the selected wheats. This was unfortunate, for, as was pointed out in connection with the selected oats, this field is low-lying and has not been known to carry a good crop in wet years. This field was spring fallowed and worked down to good condition in time for seeding. The varieties came away well, but the land becoming flooded checked all of it and killed some, leaving the final crop very irregular. The selected wheats grown in this field only averaged 5bush. 56lbs., Bayah reaching 11bush. 40lbs., whilst others dropped to 3½bush.; but no real comparison can be made with these returns as the plots were

comparatively small and the yields really depended on the amount of high land in each plot, these spots being the only ones carrying much crop. The table following sets out the yields of the various selected wheats grown in this field:—

Yields of Selected Wheats—Kybybolite, 1915.

Variety.	Selection.	Area. Acres.	Υie	tal eld. . lbs.	per .	eld Acre. . lbs.
Bayah	. 1	0.13	1	31	11	40
Bearded Bobs	2	0.12	1	16	10	33
Talavera	. 1	0.31	3	15	10	29
Tarragon	. 2	0.04	0	24	10	0
Silver King	. 2	0.75	6	24	8	32
Federation	. 1	1.12	9	29	8	28
Bordier	. 1	0.24	2	2	8	28
King's Red	. 1	0.84	6	37	7	53
John Brown	. 2	0.06	0	25	6	57
Majestie	2	0.47	3	4	6	31
White Tuscan	. 1	0.67	4	12	6	16
Yandilla King	. 1	0.45	2	48	6	13
White Essex	. 1	0.90	5	27	6	3
Baroota Wonder	. 1	0.20	1	9	5	45
Fan	. 1	0.78	4	20	5	33
Jade	. 1	1-62	8	52	5	28
Petatz Surprise	. 1	0.49	2	35	5	16
Gallant	. 1	0.45	1	53	4	11
Bobs	2 .	0.25	1	1	4	4
Lott's	. 1	0.03	0	7	3	53
World's Wonder	. 1	1.40	5	12	3	43
Marshall's No. 3	1	0.64	2	20	3	39
Golden Drop	1	1.52	5	32	3	38
Totals		13.48	79	55	5	56

The other fields carrying wheats were Nos. 5 and 11, and of these No. 5 promised high yields, and would certainly have fulfilled this promise but for the appearance of red rust, the varieties that suffered most from this trouble being Dart's Imperial, Bayah, and Baroota Wonder. The yield of 20bush. 24lbs. for Dart's Imperial does not look as if much rust was about, but the piece harvested for grain was a picked spot saved to obtain some seed, whilst the great bulk of the block was cut for hay. Field No. 11 was spring fallowed and went in very well at seeding, but the wetness of June kept the yields

low. In the table below will be found the yields of the remaining wheat crops, with the total yield for the farm:—

Wheat Variety Yields-Kybybolite, 1915.

Variety.	Field Grown. No.	Area.	To Yie Bush	ld.	Yie per 2 Bush	Acre.
Dart's Imperial	5	0.91	18	34	20	24
Queen Fan	11	11.90	210	44	17	43
King Fan	11	2.97	47	29	15	59
White Tuscan	10в	5.18	61	42	11	55
Baroota Wonder	5	10.20	119	20	11	42
Marquis	11	0.77	8	36	11	10
Marshall's No. 3	10в	1.60	17	21	10	51
Golden Chaff	11	1.27	12	50	10	6
White Essex	10в	7.13	69	5	9	41
Zealand Blue	10в	0.25	1	43	6	52
Leather Head	11	1.27	8	16	6	31
Basil	5	1.62	10	25	6	26
Brindle	5	1.37	7	14	5	17
South Africa	10в	0.72	3	43	5	10
Florence	11	0.78	3	28	4	27
Russian White	10в	0.69	2	1	2	55
Firbank	11	0.78	0	52	1	5
Federation (Exp.)		5.80	75	2	12	56
Bayah (Exp.)	5	10.95	124	11	11	20
Selections	-	13.48	79	55	5	56
Totals	-	79-64	882	31	11	5

Of the varieties yielding above the average Dart's Imperial was first from the cause pointed out above; but, despite the rust, the chances are that if all the plot had been harvested for grain it would have equalled the average yield. Queen Fan is a new wheat produced at Roseworthy Agricultural College, and has done well at this farm since first introduced as a few grains some years ago. Last year it yielded 18\frac{3}{4}\text{bush.} here when the average was but 10\frac{3}{4}\text{bush.}, and it has a good record for this last harvest at Booborowie. Turretfield, Roseworthy, and Koppio, as was pointed out in the Harvest Report of Turretfield Experimental Farm. King Fan is another product of Roseworthy Agricultural College that has done consistently well at this farm. White Tuscan is a noted South-Eastern wheat, particularly for hay. Baroota Wonder is an early wheat that is doing really well in the mallee districts, and is a hardy all round variety. Marquis is a Canadian variety tested for the first time here, and is a very attractive wheat likely to prove useful.

The final yield of 11bush. 5lbs. is low for the farm, and appears to be caused, firstly, by the excessively heavy fall of rain in June, and then by the fact

that a fair amount of the crop was in fields quite unsuitable for wheat in wet years. In the following table is shown the yields of wheat obtained at Kybybolite since 1910, with the general farm average:—

Wheat Returns—Kybybolite, 1910–1915.

			-					
	Year.	Total Rainfall. Inches.		Area. Acres.	Tota Yield Bush	d.		Acre.
1910		28.35	21.08	15.00	79	43	5	19
1911		22.23	14.72	17.15	232	45	13	34
1912		20.83	18.23	81.91	1,876	35	22	54
1913		18.44	13.93	48.20	1,288	56	26	44
1914		11.94	8.43	22.17	238	32	10	46
1915		23.32	21.18	79.64	882	31	11	5
3	Means	20.85	16.26				15	4

The individual yields of varieties have been kept at the farm, and the following setting out of the principal ones grown here since 1911 will prove of interest as showing how they have behaved during these years:—

Yields of Wheat Varieties-Kybybolite, 1911-1915.

Variety.	1911.	1912.	1913.	1914.	1915.	Means, 1911-15.	Means, 1912-15.
Federation Yandilla King Talavera Bordier Majestic Gallant White Tuscan Dart's Imperial White Essex Bayah Lott's Baroota Wonder Marshall's No. 3 Fan Queen Fan King Fan Leatherhead Firbank Florence Zealand Blue South African	B. L. 15 35 21 16 12 45 19 2 10 14 13 39	B. L. 33 29 28 16 27 5 26 16 25 27 25 20 27 27 1 27 32 29 36 30 20 22 27 24 45 — — — — — — — — — — — — — — — — — —	B. L. 23 16 30 47 31 20 25 21 24 31 25 29 45 24 41 29 9 31 33 30 55 29 31 29 41 ———————————————————————————————————	B. L. 12 30 Failure Failure Failure Failure Failure 18 6 7 49 21 49 8 21 Failure Failure Failure Failure Failure Failure Failure Failure 18 43 10 26 4 0 8 49 3 54 1 4 2 24	B. L. 12 13 6 13 10 29 8 28 6 31 4 11 11 16 20 24 9 17 11 21 3 53 10 44 8 47 5 33 17 43 15 59 6 31 1 5 4 27 6 52 5 10	B. L. 19 25 17 18 16 20 15 41 13 15 12 56 — — — — — — — — — — — — — — — — — —	B. L. 20 22 16 14 17 13 14 51 14 1 12 45 21 32 21 15 20 50 19 37 16 26 16 1 15 46
Total rainfall " Useful " rainfall	Inches. 22.23 14.72	Inches. 20.83 18.23	Inches, 18·44 13·93	Inches. 11.94 8.43	Inches. 23·32 21·18	Inches. 19·35 15·30	Inches, 18-63 15-44

This table shows the well-known variety Federation well to the fore for the period 1911-1915, but it is beaten by White Tuscan, Dart's Imperial, and White Essex over the period 1912-1915. White Tuscan has been mentioned above as being a very successful variety in the South-East, where the spring is cool and long. Dart's Imperial is very well known, and is a

good wheat in good conditions, but has the very bad fault of being rust liable. White Essex is the wheat usually known as White Tuscan wherever grown north of Adelaide, and in habit of growth and uses it is very similar to it; but the two varieties have totally different shaped heads, White Tuscan being average length and compact whilst that of White Essex is long, pointed, and open.

MISCELLANEOUS CROPPING.

The soil was so wet and cold after the main cropping was completed that late winter sown crops did not appear to have much chance. This certainly proved so, as the crops tried germinated very poorly, and made a very poor showing until everything had thoroughly warmed up.

Peas.—Only about two acres of this crop were tried this year, the variety being Egyptian, a field pea new to the State. It germinated fairly well, but conditions remained too cold for growth until the spring. The crop was cut and cocked, but unfortunately a large flock of sheep got at the cocks during the night and left very little of the grain. This variety gives promise of being a very useful one, and as seed is available in the other States we will give it a trial on a large area this coming year.

Lupins.—Three varieties of lupins were tried—yellow, white, and blue—but the germination of the whole three was very poor; in fact only a few plants of each came up.

Gram.—Three varieties of Indian gram—white seeded, red seeded, and black seeded—were tried. Two of them germinated fairly well, but the white seeded variety hardly showed a plant. These were at a standstill so long that when they did start to make growth the season had closed, with the result that the plants were very small and they set hardly any seeds before they dried up.

Kale.—Field No. 14, about 40 acres in extent, carried green feed. This was ploughed up in September and worked down to a fine tilth and 1lb. Thousand-headed kale drilled in to the acre. This germinated fairly well, as the soil was in good seeding and germinating condition, and despite the fact that there was practically no summer rains did fairly well, and will produce an enormous quantity of winter feed given average conditions. Field No. 8 was next ploughed up and worked down, but as it was getting dry could not be got into first class condition for small seeds. It was also sown with 1lb. Thousand-headed kale to the acre, but did not germinate at all well at first, and as no heavy rains fell during the summer it looked very much as if this field would prove a failure, but every light shower of rain that fell brought up more plants and kept the first ones alive, and at the beginning of autumn this field was well covered and giving promise of plenty of winter feed.

Buckwheat.—Two acres of Field No. 3 was sown with Japanese buckwheat for forage, but like all the other summer crops suffered for the need of rain. The seed germinated well and made exceptionally rapid growth until it reached 8in. to 9in. high when, for the lack of moisture, it stopped and began to wither up; sheep were then turned on it and they devoured it readily.

Sorghum, Silver Beet, Mangels, Turnips, Swedes, and Millet were sown on an area of 40 acres, the sorghum occupying 20 acres of this; but all were a failure for the want of rain. The sorghum produced a little feed, but it was a negligible quantity.

Rye Grass.—Field No. 11A was sown with Italian rye grass seed in the autumn at the rate of 20lbs. to the acre. This produced a nice quantity of feed in the spring; but the field is too high and dry for this class of grass.

EXPERIMENTAL PLOTS.

Mr. Colebatch, whilst Superintendent of Agriculture in the South-East, started permanent experimental plots at this farm dealing with the cultivation of the land. The first series arranged were Permanent Cultivation Plots, with oats, and before he left the institution he had commenced a series of Permanent Depth of Ploughing Plots with wheat.

Permanent Cultivation Plots, with Oats-Kybybolite.

In 1912 these plots were surveyed and cultivated, the various treatments received having as their object the discovering of the advantages of bare fallow, the time to plough, the time to cultivate, and the number of times to cultivate. The table following sets out the various treatments received and the results obtained since 1913:—

Permanent Cultivation Plots—Kybybolite, 1913-1915.—Oats, with 1cut. Superphosphate Per Acre.

	1 1 1	5	Tota	1		
Plots.	Treatment.		rodu		Gr	
			Acı		per A	
		T.	C.	L.	Bush	. lbs.
2 and 3	Alternate cropping without fallow	0	13	93	14	48
4 and 5	Autumn ploughed				23	12*
6 and 7	Autumn ploughed, spring cultivated	0	14	102	20	19
8 and 9	Autumn ploughed, spring cultivated, summer cul-					
	tivated	0	14	99	21	49
10 and 11	Winter ploughed	0	17	70	21	25
12 and 13	Winter ploughed, spring cultivated	0	17	83	24	22
14 and 15	Winter ploughed, spring cultivated, summer cul-					
	tivated	0	17	1	27	45
16 and 17	Spring ploughed	0	15	52	21	1
18 and 19	Spring ploughed, spring cultivated	0	13	57	29	30
20 and 21	Spring ploughed, spring cultivated, summer cul-					
	tivated	0	18	24	28	39
22 and 23	Summer ploughed	0	14	63	21	14
24 and 25	Summer ploughed, summer cultivated	0	9	106	16	48
26	Annual cropping	0	8	47	12	14
	* For two years only.					
	Dr arrange a					

PLOUGHING. CULTIVATION.

Autumn...... April, May Spring September, October

Winter June, July Summer November Spring September

Summer..... November

The above table sets out the averages for the period stated, which included two seasons by no means normal ones, so the results for each of these seasons is necessary, and will be found below:—

Permanent Cultivation Plots—Kybybolite, 1913-1915.—Algerian Oats, with lcwt. Superphosphate Per Acre.

	1913.				191-	1.		1915.				
Plots.	Grain per Ac Bush, l	re.	Pi	Fota rodu r Ac	сe	Graper 2	Acre.	P	Fota rodu r Ac	ce	Graper A	
2 and 3 4 and 5 6 and 7 8 and 9 10 and 11 12 and 13 14 and 15 16 and 17 18 and 19 20 and 21 22 and 23 24 and 25 26	26 3 28 3 32 3 39 46 3 53 48 37 3	37 0 1 34 11 29 18 5 8 26 21 30	0 0 0 0 0 0 0 0 0 0 0 0 0	10 9 10 8 9 12 7 10 13 7 6 3	81 0 37 52 25 87 62 100 87 75 37	8 10 10 9 10 13 8 12 17 10 8	31 18 18 16 4 18 24 27 0 13 11 27		17 0 0 19 6 6 1 3 16 2 1 3 13 13	75 58 11 86 104 2 90 17 52 60 39 26 58	9 22 22 22 22 22 24 23 19 23 21 16	25 38 39 28 25 25 1 37 10 7 10 2 13 34
Farm averages for oats	15	18				10	7				15	28
Total rainfall		14	I	nche 11.9	94	~		1	nehe 23 : 21 :	32	-	

These results have not been conducted for a sufficient number of years (particularly as two of them are very abnormal seasons) to hope to be able to interpret the yields correctly, but as far as they go they appear to show:—

- (1) That some form of fallowing is necessary, for the alternate cropping without fallow (Plots 2-3) is very little better than the annual cropping (Plot 26).
- (2) That when summer ploughed the land is better left until seeding operations rather than be stirred up soon after the ploughing (Plots 22-25).
- (3) That spring ploughing, providing cultivation follows, is a little better than any other form of treatment (Plots 18-21).
- (4) That land ploughed in the winter needs much after cultivation, and is the only time when summer cultivation is of much advantage (Plots 14-15).
- (5) That autumn ploughing does not give results equal to winter and spring ploughing, nor is it indeed much better than the summer ploughing alone (Plots 4-9 and 22-23).

These results seem to hinge largely on the fact that these particular soils break down very finely at every cultivation, and when the rains come they set like a brick. This would certainly help to account for the failure of autumn ploughing, and is possibly the cause of the depressing effect of summer cultivation applied when the land has been ploughed in the spring and in the summer.

Permanent Depth of Ploughing Plots-Kybybolite.

These plots were surveyed and working commenced in 1914, and the results recorded for this year are the first obtained. They have for their object the testing of the value of various depths of ploughing done at different times of the year, and also the effects of varying the depth at which the land is ploughed. If the yields of this past season are anything to go on they prove conclusively that deep ploughing is advantageous in these special conditions; but they also show that ploughing in front of the drill is better than fallow—a thing that has not proved so in the cultivation plots which have been cropped for three years. In any case, for this particular year the 9in. ploughing was well ahead—both in total produce and grain—of all other depths. The 4½in., 6in., and 7½in. showed very little difference one with the other; but the 3in. ploughing was a good deal below all others. This can be seen by a glance at the following table setting forth the average yields of the plots ploughed at these various depths:—

Influence of Various Depths of Ploughing-Kybybolite, 1915.

			Tota	.1		
Treatment.	Number	\mathbf{P}	rodu	ce	Gra	ain
	of Plots.	pe	r Ac	re.	per A	Acre.
		T.	C.	L.	Bush	. lbs.
9in, ploughing	3	0	19	105	15	1
7 in. ploughing	6	0	16	35	13	1
6in. ploughing	3	0	17	20	12	41
4 in ploughing		0	15	76	12	47
3in. ploughing	3	0	13	77	11	17

Details of these plots will be found in the next table :--

Permanent Depth of Ploughing Plots—Kybybolite, 1915.—Federation Wheat, with 1cwt. Superphosphate Per Acre.

			Tota	l ·		
Plot.	Treatment.	P	rodu	ce	Gr	ain
		pe	r Ac	re.	per A	Acre.
	•	T.	C,	L.	Bush	
lA	Ploughed 3in. deep in winter	0	13	35	7	51
2A	Ploughed 4½in, deep in winter	0	12	46	9	18
3a	Ploughed 6in, deep in winter	0	15	57	11	43
4A	Ploughed 7kin, deep	0	18	68	10	53
5A	Ploughed 9in, deep in winter	1	0	76	12	37
6a	Ploughed 3in deep in spring	0	10	38	11	22
7A	Ploughed 4½in. deep in spring	0	15	40	10	2
8a.	Ploughed 6in, deep in spring	0	15	40	10	59
9a	Ploughed 7 in, deep in spring	0	12	19	13	48
10a	Ploughed 9in. deep in spring	1	1	80	14	49
11_{A}	Ploughed 3in, deep in autumn at seeding	0	17	46	14	37
12A	Ploughed 4½in. deep in autumn at seeding	0	12	32	13	19
13A	Ploughed 6in. deep in autumn at seeding	1	0	76	15	22
14A	Ploughed 7½in. deep in autumn at seeding	1	0	76	13	18
15A	Ploughed 9in. deep in autumn at seeding	0	17	46	17	37
16A	Ploughed 4 in, deep in spring Deeply ploughed every	50	15	57	11	2
17A	Ploughed 7 in. deep in spring second fallow	10	16	61	13	10
18A	Ploughed 4 in. deep in spring	0	14	38	12	54
19_{A}	Ploughed 4 in, deep in spring Deeply ploughed every	$\langle 1 \rangle$	2	84	15	47
20_{A}	Ploughed 7 in. deep in spring	11	0	76	16	33
21_{A}	Ploughed 44in, deep in spring)	ĈΟ	14	53	16	41
$22_{\rm A}$	Ploughed 4 in. deep in spring > Deeply ploughed every	$\langle 1 \rangle$	0	76	13	31
$23_{\rm A}$	Ploughed 4 in. deep in spring fourth fallow	0	13	35	12	30
24A	Ploughed 72 in. deep in spring	0	9	24	10	26
		-				

The only other field experiment with cereals was a lime test, results of which are to be found below:—

Lime Test with Bayah Wheat-Kybybolite, 1915.

Treatment.	Area.	Tot Yie Bush,	ld.	Yie per A	Acre.
One ton lime in autumn	Acres.				
One hundredweight superphosphate at seeding	6.67	79	17	11	53
One hundredweight superphosphate	4.28	44	54	10	29

These figures are hardly a criterion of the effects of lime on wheat for the season, as unfortunately the variety used is rather rust liable, and it suffered very considerably. The limed portion of the crop made very much stronger growth than the untreated, and was so vigorous and sappy that it took the rust to a much greater extent than did the untreated portion that was so much behind it in luxuriance. Before harvest the difference between the two plots was very marked, and looked bushels in favor of the lime, but when cleaned the difference was but little more than a bushel.

POTATO CULTURE.

A paper on this subject was contributed by Mr. R. Fowler (Inspector of Orchards) at the Conference of the South-Eastern Branches of the Agricultural Bureau. The writer of the paper mentioned that when larger areas of peat and swamp lands were made available by drainage, and smaller holdings were more popular, the potato crop would take its place as one of the most important. Despite that fact, however, in his opinion, there had been during the past few years a decline, not only in the area put under that crop in the Mount Gambier district, but also in the average yields, a statement that was borne out by statistics. That position, however, would not continue.

"On the expensive volcanic soils round Mount Gambier," the paper continued, "some crop other than grain must be grown at least once in three or four years. There is no other crop that will give a fair return for the time and money spent on it, and at the same time bring the soil back into a good condition for other crops, like the potato.

"It will, perhaps, be argued that potatoes do not pay, there is so much expense attached to their cultivation, and under present methods, with a crop return of 2 tons or so to the acre, this may be so; but the point is—Cannot we improve in some way or other our standard of cultivation? If our land is showing signs of exhaustion, is there no treatment that will restore it to its original fertility?

"The potato will grow in many soils, but it does best in a rich loamy soil or well-drained peat. It will also succeed in deep sandy loams, but will not thrive in stiff clay or undrained peat. It likes a nice warm, comparatively dry climate, but needs a fair amount of rain during the growing period.

SUITABLE SEED.

"In regard to the seed, it will be found that 'like will produce like' in the majority of cases, and it is owing to some fault in the selection if that which was once a good variety 'runs out.' The features of a good variety are disease-resisting powers, good cooking quality, high yield per acre, shallow eyes, and good keeping qualities. naturally stronger than others, and will withstand adverse conditions better and remain longer in cultivation; but no matter how strong a variety may be, it cannot withstand the degenerating influences of bad seed selection. If any crop is started off with very poor seed the result is almost certain to be poor also. The method of seed selection in the majority of cases when the crop is lifted is for the seed to be taken from the rejects from the marketable sample or from the bulk if pitted. If it happens, as in a year like this, that the price is high, and dealers will accept a small sample, much of that which should be retained for seed will find its way to market, and there will be only diseased and very small rough stuff, fit only for cattle food, from which to select the seed. After the marketable stuff has been carted in, the small rejects are stored in heaps or bags in any convenient place, and perhaps left for some time, probably till planting, by which time they will have grown perhaps a mass of long pale shoots, which are broken off at planting. There is no doubt that the seed suffers from this treatment.

"If this is practised, the best cannot be secured, as after the crop is all heaped up together, it is impossible to tell the product of the strong from that of the weak. In the natural order of things, the weak will produce more small potatoes than the strong. With this indiscriminate selection the result will be that in a few years the larger percentage of the seed will be from weak plants, and by continuing the process, we arrive at the stage when the potato is 'run out.' It should be remembered, though, that there are two classes of small potatoes—those that inherit their weakness from the parent plant, and those which, owing to late development, have not had time to ripen. There is no objection to the use of the latter for seed, and that is the reason round seed taken from a crop grown from cut seed will generally give good results.

"The ideal method of selection would be that done in the growing crop while still green, and at the digging time. It should be possible to select enough each year to grow what might be called a stud plot, where selected seed would be used to produce the seed for the bulk crop, the size of the stud plot depending on the area to be planted each year.

TREATMENT OF POTATO SEED.

"A point worth noting here is the time when potatoes intended for seed should be dug. It has been clearly demonstrated by experiments carried out for a number of years that immature seed will increase the yield considerably. In the experiments carried out last year in Victoria by Mr. J. T. Ramsay the increase in the yield due to the use of immature seed amounted to $1\frac{1}{2}$ tons to 2 tons to the acre, or about equal to our average return.

"I know that it is contrary to preconceived ideas, because, as a rule, the seeds of all plants require to be thoroughly ripe before they will successfully reproduce their kind; but it must be remembered that the potato sett is not the true seed of the potato plant; that is contained in the potato apple or berry produced on top of the plant after flowering. The seed used for planting is merely a cutting, an enlarged portion of an underground stem, for tubers are not produced on the root of the potato plant, but on underground stems, which if exposed to the air and light would develop leaves like the rest of the plant. In fact, small potatoes growing above the ground must often have been noticed, and where these occur there is rarely anything underneath.

"By immature seed I mean seed dug before the crop is ripe, not seed made green by exposure to the air, though that is the condition the seed should be in at planting time.

"A very good way in which to obtain this condition is to store the seed where it will get plenty of ventilation, and also be exposed to light, a good place being under the shelter of a clump of pines, where the seeds will not come directly under the rays of the sun. It should be spread out thinly on the ground, on the floor of a shed, or in special seed boxes. The floor of a drying shed attached to a shearing shed makes an ideal place for storing seed.

SPROUTING.

"The practice of sprouting seed is strongly advocated, as a rule, and it has many advantages, though it entails a considerable amount more work. If seed were boxed and sprouted before planting, a considerable amount of the failures or 'misses' in the crop would be filled, as it would be possible to cull out those that should not be planted.

"It must often have been noticed that potatoes will throw out thin, spindly shoots, or perhaps grow another small tuber close to the eye. Such potatoes are no good for seed, being affected by what is known as spindle disease, and this condition is brought about by reduced vitality or degeneration of the seed, and it has been found by experiments that when potatoes are planted in a very dry soil, so that only small, unripe tubers are produced, or when, after making luxuriant growth in the early stages, a severe drought checks the growth, as in a season like the present, a considerable percentage will be affected with spindle disease, and it is advisable to go in for a complete change of seed.

"Another advantage of sprouting seed is that in the majority of cases only one strong shoot, having short internodes, will develop from the terminal bud. This will subsequently produce a better system of underground branches, and consequently more tubers than if every eye on the potato seed sprouted. Sprouted seed will give a heavier yield of marketable tubers than will a potato of the same size that has sprouted from every eye. Sprouted seed will also be ready for digging before unsprouted.

WHOLE OR CUT SEED.

"As to the wisdom of planting whole or cut seed, if it is very large I should say cut it; if a nice handy sized round seed that would cut only two small setts, it might be better planted whole; but that would depend upon how much seed was available and the ground you wished to plant.

"An acre of the round seed would give more than an acre of the cut, if small seed were halved; but an acre of cut seed, cut from large potatoes, would give more marketable tubers than the small round seed under average conditions. It has been found by experiment that it is not advisable to cut to one eye, unless the seed is very strong and the land first-class potato soil. Whole seed should be used if the ground is moist or peaty land. Experiments have proved, also, that the stem end of a potato will produce as good potatoes as the crown, and I do not think it a good practice to cut off the crown, as there is no doubt that the best shoot comes from there. In a very dry soil or in a dry season I should say the larger the seed the better for the young plant, which in its early stages depends upon the food and moisture in the seed.

PLANTING.

"The depth to plant is another point on which there is no fixed opinion, but in experiments carried out over a period of six years in Canada 3in. to 5in. was found to be the best depth; but it must be re-

membered that the shallower the potatoes the more the potato moth will spoil, and that is a serious consideration. The general practice is to plant in rows about 27in. to 28in. apart, and 20in. to 24in. apart in the rows. Potatoes should not be left too long after cutting before planting, nor should they be planted in wet soil or during wet weather.

"The land needs to be in a good mechanical condition—that is, it should be well worked up and friable. It should contain as much vegetable matter-humus-as possible. The fact that virgin land will often produce the best results shows the necessity for this, and land should be so treated that, if possible, it becomes richer and not poorer for every successive crop taken from it. Rotation of crops is one of the best methods of restoring the physical state of the soil. The essential elements in the soil are nitrogen, potash, phosphoric acid, and lime, and as soils vary so much, even in one district, no set quantities of either can be stated. A good mixed dressing would be 2cwt, super., 1ewt. Thomas phosphate, 1ewt. sulphate of potash, 1ewt. sulphate of ammonia. The land should be in a good state to start with, and should be kept so by frequent stirring with the horse hoe. Until the plants are 3in, or more high the harrow is an effective implement to use unless the land is very dirty with weeds; 11 in. to 2in. is generally deep enough to cultivate. In the peat lands, owing to its liability to drift and blow away, very little in the way of cultivation can be given after the crop is planted.

"It is necessary that potatoes should be well mounded, as the deeper the tubers are covered the less liable are they to injury from disease, particularly potato moth; and harvesting, particularly if this operation is done with a machine, is much simpler if the rows can be followed.

"I have seen a number of different potato-digging machines at work, but so far they appear to give fair results only where the land is clean and dry, and under those conditions they appear to act well and should represent a big saving in labor.

VARIETIES.

"In selecting varieties, consideration must be given to the position of the field and the market that is to be supplied. Where high land, safe from frosts, is available, and it is desired to plant early, Bismarcks, Pinkeyes, or Early Manistee may be used. For planting a little later, there is the choice of Up-to-date, Scottish Triumph, Redskins, and for late planting Snowflakes and Carmens. Different districts suit different varieties. In the peat soils Redskins come first, then Snowflakes, with Up-to-date, Scottish Triumph, or Coronation. In the Kalangadoo district, from what I have seen, I should say

the Pinkeye, White and Blue Prolific give the best results. Redskins seem to do fairly well, but are much subject to 'brown fleck.'

"The time for planting will also depend on circumstances, but it is not safe to plant much before August or later than December. I like late planting for Snowflakes under average conditions.

MARKETING.

"I think it a mistake on the growers' part to market potatoes that are small and dirty or diseased. The grading should be conscientiously carried out. To attempt to palm off inferior stuff is certain to prove unprofitable to the grower and cause a lot of after trouble. I certainly think that growers should brand their names on the bags. If this practice were adopted it would give some encouragement to the grading of good samples only, and the grower with inferior stuff would be ashamed to put his name on his bags unless the sample was made as good as possible, and would probably endeavor to grow a better sample the next season.

"The consumer would benefit in that he would get better and cheaper potatoes, for it stands to reason that, though the inferior, diseased, and scabby potatoes may be palmed off while sewn up in bags, it is a different matter when they come to be parcelled out in pounds and quarters, and the more dirt, waste, and rubbish the greengrocer has to put out, the more he must charge for what is left. He would soon learn to know those whose brand of potatoes he could rely on, and would see that he got that brand."

The writer then referred to diseases and pests which were troublesome.

ADVISORY BOARD OF AGRICULTURE.

The June meeting of the Advisory Board of Agriculture was held on Wednesday, the 14th, there being present Messrs. F. Coleman (in the chair), G. R. Laffer, M.P., A. M. Dawkins, C. E. Birks, C. J. Tuckwell, T. H. Williams, J. Miller, and H. J. Finnis (Acting Secretary).

Destruction of Sparrows and Starlings.—The Director of Agriculture forwarded a letter received by him from Mr. A. G. Edquist, in regard to the question of the destruction of birds by poisoning, in the

course of which it was stated that suddenly to banish immense numbers of birds from the orchards and vineyards would be to give protection to the insect pests, which became active during the winter and the spring. The present season had provided a splendid example of what might have happened had the birds been absent from the orchard and vineyard. He referred to the millions of green caterpillars and bugs that attacked the vines and bunches of green fruit, but were held in check by birds. It would be more rational to indulge in regular destruction of the pests, and avoid the second disaster, consequent on the death of the birds. To destroy the birds by poisoning the broken grapes and fruit would lead to a slaughter of the innocents. Nearly all the honey-eaters, which were particularly fond of scale insects at that season of the year, might be found drinking the fermenting juices in grapes, plums, and pears. That action led to the belief that they were all fruit-eaters. It was, therefore, not advisable to poison the residium of crops any more than it was to poison drinking water set out in tins. He asked the department to set in motion the necessary factors in the production of a right and rational public opinion regarding the wisdom of the proposed action. Mr. Laffer said Mr. Edquist should be requested to supply a list of birds likely to be poisoned by the proposed scheme of poisoning grapes and currants. The only two birds he knew of that were likely to be affected were the wattle bird and the English blackbird. Of all the native birds, the wattle bird was the most destructive to crops. Mr. Dawkins said the English blackbird did great harm to orange crops. It was decided that the matter should stand over till the next meeting.

Collecting Statistical Data.—A resolution from the Blackwood Branch, dealing with the method of collecting statistics, and a report thereon from the Government Statistician, were considered. It was decided that Mr. Laffer should interview the Government Statistician in regard to the matter.

Advisory Council of Education.—Professor Arthur J. Perkins was nominated as the Board's representative on the Advisory Council of Education.

Life Members.—The names of Messrs. R. Pavy (Crystal Brook) and R. H. Satchell (Narridy) were added to the list of life members of the Agricultural Bureau.

New Branches.—Approval was given to the formation of new Branches at the undermentioned centres, with membership as follows:—Yacka (16 members); Loxton (35 members); Tantanoola (27 members); Pompoota (27 members).

Forty-eight names were added to the rolls of existing Branches.

THE AGRICULTURAL OUTLOOK.

REPORT FOR THE MONTH OF JUNE.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—The weather has been very seasonable; splendid rains have fallen at intervals during the month. The wind at times was very strong, and some damage has been done to windmills. Crops—The majority of farmers have finished seeding. The earlier sown wheat is showing up, and all crops will benefit from the rains. Natural Feed—Grass is beginning to shoot, but cold weather has checked it to some extent. Stock—Large stock is looking well, but the young lambs are feeling the cold bleak winds. Pests—Foxes and eaglehawks are numerous. Miscellaneous—This month has altered the appearance of the season from a poor one into one that shows prospects of being very good.

Kybybolite.—Weather—Previous seeding rains, although adequate, were not excessive, and farmers welcomed a fall of 123 points at the beginning of the month, followed by a little over a week's warm weather. During the latter half of the month light rain has been fairly continuous, and extremely cold conditions have prevailed. The total rainfall for the month was 335 points. Crops—Seeding is complete, with few exceptions, and the majority of crop sown had made good growth before the cold weather set in. The late-sown grain is a long time germinating, but the ground is not yet too wet for good results. Cereals sown early for greenfeed have already been available for the first feeding. Natural feed is plentiful, but is not making any extra length. Stock are in good order; there have been losses among the late autumn lambs through the extreme cold experienced at the time of dropping, but losses from other causes since last month have been extremely light.

Turretfield.—Weather—The anxiety of farmers in regard to rain was set at rest early in the month, 123 points being registered during the first five days. June has turned out a wet month, the rainfall totalling 5½ in. There were no sharp frosts, though some cold and boisterous days were experienced. Crops—Many farmers preferred to wait for rain before seeding, and owing to the continued wet weather in June they have been omewhat hampered in their seeding operations. A week's fine weather, however, would enable all farmers to complete this work. Crops sown before the rain are up and looking well. Natural Feed—Grazing paddocks are showing up green, and stock are able to get fair pickings. Stock are healthy and in good condition. Pests—Foxes are still fairly numerous. Rabbits are not so much in evidence. The present high prices for meat have caused a demand for rabbits, and trappers account for a large number, which are sent to the city. Miscellaneous—The North Para has been in flood on a number of occasions during the month, and has caused considerable inconvenience.

Veitch.—Weather—The weather conditions this month have considerably improved. The rain gauge at Veitch registered 163 points up to the 27th (average 166 points). We have experienced a few cold, windy days, and also one very heavy frost. Crops—Crops throughout the district are now showing a nice healthy color. Some of the fields seeded in April are thin in the germination, but the plants are stooling out well. Natural Feed—The season's scrub feed is now shooting up in the shape of barley grass, mustard, saltbush, &c. Stock all in healthy condition. Pests—Rabbits are making their appearance; some of the old warrens are again being opened. Miscellaneous—Fallowing operations have started now that the rubbish has germinated.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on July 1st:-

Butter.—Since the beginning of June magnificent rains have been experienced throughout the State, the quantity falling in many places constituting a record. Production may, therefore, be expected to increase rapidly now. During the month, however, values advanced in sympathy with the strong prices ruling in the eastern States, so that at the close ''Alfa'' was 1s. 10½d.; ''Prinus,'' 1s. 9½d.; choice separators and dairies, 1s. 6½d. to 1s. 7½d.; store and collectors', 1s. 3½d. to 1s. 5d. per lb.

Eggs.—Undoubtedly better attention is being paid to this department of the farm, the big grain harvest of last year allowing larger quantities of birds to be kept, and it seems apparent also that a better class is being bred. Eggs are in much greater supply, so that more export trade is being done, and values have receded to:—Hen, 1s. 3d.; duck, 1s. 4d. per dozen.

CHEESE.—Supplies coming forward are perhaps not quite as great, and this, combined with continued local demand, and also fair export orders, has firmed prices to the extent of about 4d., values now being from 10d. to 10½d. per lb. for large to loaf.

Bacon.—Quantities continue to increase, and in conjunction with the slower seasonable demand, rates have further eased a little. Best factory cured sides, 1s. to 1s. 1d.; hams, 1s. to 1s. 0½d. per lb.

HONEY.—Local purchasers seem to have obtained their requirements in full, but there is still some export business going through. However, prices are not quite so high, prime clear extracted now selling at 5d.; second grades, 4d. to 4½d.; beeswax, very saleable at 1s. 5d. per lb.

ALMONDS.—Under the influence of consignments continuing to be short of trade wants, values are a little higher, and Brandis are now 9d. to 9½d.; mixed softshells, 8½d.; hardshells, 4d.; kernels, 1s. 5d. to 1s. 6d. per 1b.

LIVE POULTRY.—The pennings, which have been considerable during the month, certainly show that more attention is being paid by the farmers to this line. The class of bird also is much improved, and in spite of the fact that larger numbers are coming along, yet, doubtless owing to the high prices ruling for meat, values have maintained firm, and the prospect is that they will continue to do so. Good table roosters realised from 3s. 6d. to 4s. each; nice-conditioned cockerels, 2s. 9d. to 3s. 3d.; plump hens, 2s. 6d. to 3s. 6d.; ducks, 2s. 8d. to 4s.; geese, 5s. to 6s.; pigeons, 10d. each; turkeys from 9d. to 101d. per lb. live weight for fair to good table birds.

POTATOES AND ONIONS.—Moderate supplies of potatoes have arrived from Mount Gambier district, but for the remainder of this year the quantities available there are not likely to affect the market to any appreciable extent. Samples arriving from Ballarat have, generally speaking, been satisfactory, and for the next few months the bulk of our supplies must be imported. Onions.—There has been no activity in this line, and supplies continue to come forward from the Colac district. Prices:—Potatoes—Prime Snowflakes, £7 per ton on rails, Mile End or Port Adelaide. Onions, £5 5s. per ton on rails, Mile End or Port Adelaide.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of June, 1916, also the average precipitation to the end of June, and the average annual rainfall.

Station.	For June, 1916.	To end June, 1916.	Av'ge. to end Juse	Av'ge. Annual Rainfali	Station.	For June, 1916.	To end June, 1916.	Av'ge. to end June.	Av'ge. Annual Rainfall			
	FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.						
Oodnadatta	2.77	5.33	2.92	4.76	Spalding	5.03	9.19	8.77	20.25			
Tarcoola	0.70	1.16	3.60	7.58	Gulnare	5.06	8.88	8.47	19.74			
Hergott	0.45	0.95	3.43	6.04	BundaleerW.Wks.	4.68	9.35	7.35	17.29			
Farina	0.74	1.65	3.86	6.70	Yacka	4.75	7.48	7.07	15.27			
Leigh's Creek	0.77	1.18	4.95	8.66	Koolunga	3.84	7.47	7.45	15.94			
Beltana	1.18	2.01	5.12	9.22	Snowtown	5.07	8.12	7.48	15.70			
Blinman	2.44	3.34	5.02	12.83	Brinkworth	5.14	8.62	7.20	15.48			
Hookina	3.49	5.24			Blyth	4.12	8.45	7.77	16.34			
Hawker	2.95	4.35	6.03	12.22	Clare	7.06	13.26	11.11	24.30			
Wilson	2.56	3.45	5.98	11.78	Mintaro Central .	8.44	12.60	9.78	21.99			
Gordon	1.79	2.82	5.06	10.26	Watervale	8.40	13.31	12.51	27.17			
Quorn	3.17	4.46	6.50	13.78	Auburn	6.38	10.48	11.09	24.25			
Port Augusta	1.50	3.06	4.90	9.46	Hoyleton	4.22	7.03	8 49	17.96			
Port Augusta W.	1.34	2.81	4.58	9.36	Balaklava	3.11	6.00	7.70	16.03			
Bruce	1.88	2.81	4.85	10.01	Port Wakefield	3.43	6.02	6.84	13.13			
Hammond	2.29	3.31	5.49	11.46	Terowie	2.13	4.25	6.13	13.71			
Wilmington	4.69	6.88	8.57	18.26	Yarcowie	2.51	5.58	6.33	13.91			
Willowie	2.85	4.11	5.69	11.90	Hallett	3.24	5.65	7.16	16.40			
Melrose	6.82	9.39	11.01	23.04	Mount Bryan	4.55	8.53	6.90	15.73			
Booleroo Centre	3.81	5.51	7.34	15.83	Burra	5.59	8.78	8.11	17.82			
Port Germein	2.13	4.25	6.40	12.84	Farrell's Flat	5.04	8.47	8.70	18.87			
Wirrabara	6.07	8.80	8.79	18.91			101.	1 0 10	1001			
Appila	2.45	4.18	7.01	15.08	West or	Maron	177 D 17	YO T				
Cradock	2.02	2.78	5.44	10.86								
Carrieton	3.10	4.49	5.76	12.22	Manoora	5.13	9.28	8.23	18.09			
Johnburg	2.05	3.11	4.74	10.21		4.35	7.96	9.20	19.69			
Eurelia	3.22	4.72	6.19	13.24	Marrabel Riverton	5.56	9.91	8.66	18.94			
Orroroo	3.00	5.19	6.58	13.42	Tarlee	5.61	11.89	9.48	20.48			
Black Rock	2.80	4.83	5.94	12.25	Stockport	4·86 5·00	9.37	8.11	17.48			
Petersburg	2.44	4.57	6.11	13.07	Hamley Bridge	5.18	10·15 9·44	7.28	15.89			
Yongala	3.69	5.68	6.28	13.94	Kapunda	5.77	10.73	7.77	16.45			
TAT.	октн-Е				Freeling	5.88	10.73	9.02	19.67			
TT 1.					Greenock	8.03	13.17	9.56	21.46			
Nackara	1.64	3.09			Truro	6.25	10.88	8.77	19.74			
Yunta	1.20	2.46	4.04	2.00	Stockwell	7.06	10.80	9.04	20.30			
Waukaringa	1.52	2.02	4.34	8.22	Nuriootpa	7.94	12.54	9.47	21.25			
Mannahill	1.65	2.15	4.15	7.94	Angaston	8.28	12.69	9.87	22.25			
Cockburn	1.35	2·11 1·28	4.34	8·46 7·97	Tanunda	8.24	12.95	10.26	22.28			
Broken Hill, NSW	0.80		4.45	9.63	Lyndoch	7.30	11.40	10.45	23.01			
			5.08	8.03			1 10	1 20 20	1 20 02			
Dent Divi	WER NO				ADEL		Plains.					
Port Pirie	3.06	5.26	7.65	13.21	Mallala	4.00	7.75	8.10	16.88			
Port Broughton .	3.17	6.34	7.12	14.33	Roseworthy	5.31	8.97	8.12	17.31			
Bute	4.27	7.16	7.41	15.42	Gawler	6.66	11.69	9.08	19-21			
Laura	4.31	7.27	8.27	18.22	Two Wells	5.31	8.80	8.05	16.36			
Caltowie	3.38	6.76	7.70	17.27	Virginia	5.85	9.38	8.52	17.58			
Jamestown	4.41	7.30	7.65	17.46	Smithfield	7.15	10.33	8.31	17.30			
Gladstone	3.06	5.90	7.22	16.00	Salisbury	7.80	11.31	9.05	18.57			
Crystal Brook	3.34	6.14	7.34	15-62	North Adelaide	9.81	14.32	10.28	21-49			
Georgetown	4.43	7.92	8.51	18.32	Adelaide	8.58	12.75	10.10	21.04			
Narridy	3.17	6.11	6.88	16.79	Brighton	8.33	13.09	9.85	19.93			
Redhill	4.12	7.51	8.96	16-79	Glenelg	7.62	10.95	9.09	18.35			
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RAINFALL-continued.

KAINFALL—continued.												
Station.	For June, 1916.	To end June, 1916.	Av'ge. to end June.	Av'ge. Annual Raintall	Station.	For June, 1916.		Av'ge. to end June.	Av'ge, Annual Rainfall			
ADELAIDE PLAINS—continued.					West of Spencer's Gulf—continued.							
				07.00		CERS	äULB0	onunue	a.			
Magill	8.42		12.65	25.69	Streaky Bay	4.68	6.94	7.60	15.31			
Glen Osmond	10.66	16.43	12.03	25.26	Port Elliston	5.27	9.66	7.94	16.49			
Mitcham	9.81	14.31	11.35	23.47	Port Lincoln	7.49	11.15	9.37	19.88			
Belair		4.55	14.08	28.64	Tumby	4.23	6.69	6.98	15.00			
Monwa	Lowns	RANG	TP CZ		Carrow	4.14	6.38					
		: 202210		,	Cowell	1.93	3.31	5.97	11-76			
Houghton	12.80	74.4~	79.00	00.10	Point Lowly	2.22	3.47	5.87	12.21			
Teatree Gully	9.22	14.45	13.90	28.19								
Stirling West	17.57	25.71 25.19	21.89	46.70 44.35	York	e's Pe	NINSUL.	4.				
Uraidla	17.25 11.52	18.42	20·89 15·95	33.67	Wallana		1 00-	1 -01	11405			
Clarendon	7.67	12.65	11 15	23.32	Wallaroo	3.09	6-97	7.24	1			
Morphett Vale	6.78	10.27	9.76	20.28	Kadina	4.24	7·61 8·14	7.92	15.88 15.22			
Noarlunga Willunga	8.95	13.86	12.21	25.98	Moonta Green's Plains	4.18	7.27	7·80 7·60	15.73			
Aldinga	7.14	10.74	9.78	20.34	Maitland	7.46	11:70	9.69				
Normanville	8.31	12.28	9.91	20.65	Ardrossan	4.37	7.14	6.78	13.89			
Yankalilla	9.18	13.69	11.46	22.78	Port Victoria	5.96	9.18	7.62				
Cape Jervis	6.05	8.16	7.80	16.34	Curramulka	5.67	9.22	8.56				
Mount Pleasant .	8.35	13.74	12.25	26.87	Minlaton	7.14		8.26				
Blumberg	10.45	15.31	13.57	29.38	Stansbury	5.53	8.06	8.02				
Gumeracha	10.77	16.67	15.24	33.30	Warooka	5.99	9.13	8.16	1			
Lobethal	13 67	19 01	16.08	35.38	Yorketown	7.06		8.12				
Woodside	9.77	14.57	14.23	31.87	Edithburgh	6.63		7.98	16.48			
Hahndorf	8.81	14.49	15.90	35.45			,	1	1			
Nairne	7.11	11.33	13.24	28.83	South	AND S	ourn-E	AST.				
Mount Barker	9.43	15.40	13.85	30.93								
Echunga	10.53	15.85	15.44	32.83	Cape Borda	5.82		12.23				
Macclesfield	8.75	14.26	13.56	30.72	Kingscote	6.44	9.62	8.94				
Meadows	12.29	18.61	16.33	35.52	Penneshaw	6.20		10.14				
Strathalbyn	6.00	9.00	8.89	19.28	Cape Willoughby.	6.39	1	9.00				
3/	77	77			Victor Harbor Port Elliot	5.28 4.88		9.60				
Murray	FLATS	AND V.	ALLEY.		Goolwa	5.03		8.49				
Wellington	3.73	6.16	7.17	15.01	Pinnaroo	3.22						
Milang	3.31	5.57	7.86	16.08	Parilla	3.99	1	-	_			
Langhorne's Brdg	3.11	5.55	7.04	15.27	Lameroo	4.10	1 .	7.39	16.55			
Tailem Bend	4.16	6.27			Parrakie	3.84	1 -		_			
Murray Bridge	2.95	5.15	6.81	14.32	Geranium	4.33		_	_			
Callington	3.90	5.77	7.40	15.65	Peake	4.86			-			
Mannum	2.01	3.33	5.84	11.67	Cooke's Plains	5.43	8.16	6.77				
Palmer	3.58	6.08	6.88	15.60	Meningie	7.49						
Sedan Blanchetown	3·25 1·00	2.07	5·75 5·31	11.92	Coonalpyn	5.75		t .				
Eudunda	4.26	7.46	7.90	17.33	Coomandook	5.55			16.80			
Sutherlands	2.22	4.50	4.88	10.60	Tintinarra	5.08			18.78			
Morgan	0.96	1.87	4.38	9.29	Keith	4.74			70.70			
Overland Corner .	1.01	1.95	5.51	11.42	Bordertown	4.37						
Renmark	1.41	2.54	5.99	10.93	Wolseley	4.06						
Loxton	1.82		_		Frances	3.82						
	1	1 - 50	i	1	Naracoorte	4.38						
West o	F Spen	CER's C	4.1TT		Penola	5.44		1	1			
				1 10 10	Lucindale	5.11						
Eucla	1.20	3.44	5.74	10.13	Kingston	6.19						
White Well	1.38	5.09	4.65	9.67	Robe	8.54			1			
Fowler's Bay	3.02	5.43	6.38	12.11	Beachport	9.47		1				
Penong	3.79	6.40	5.94	11.93	Millicent	9.08						
Murat Bay	2·90 3·28	5·29 5·41	_	_	Mount Gambier . C. Nrthumberland	1	4					
Smoky Bay	3.79	9.41	1		C. Intumumberianu	0.04	32.02	1220				
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AGRICULTURAL BUREAU REPORTS.

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				Gawler River	*		
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Angaston	*		_	Geranium	*	29	26
Appila-Yarrowie	*		_	Gladstone	*		20
Arden Vale & Wyacca	*				*		
Arthurton	*	8	12	Glencoe	*		
Balaklava	*	٥	1.2	Glencope	*		
Beaufort	+	12		Goode	*	10	
Beetaloo Valley	I	14		Green Patch	*	10	
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Berri	1096		10	Halidon	1097	12	9
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Booleroo Centre				Hookina	*	11	0
Borrika	1091			Inman Valley	+	3.5	12
Bowhill	*		-	Ironbank	+ +	15	12
Brentwood	*	13	10	Julia	*	_	_
Brinkley	*	15	12	Kadina	i		
Bundaleer Springs	1087			Kalangadoo	1103	8	12
Burra	*			Kanmantoo	*	8	12
Bute	‡		_	Keith	*		_
Butler	3	_	-	Ki Ki	*		-
Caltowie	*		-	Kingscote	*	_	
Canowie Belt	*			Kingston-on-Murray.	*		
Carrieton	1			Koonibba	1	11	8
Carrow				Koppio	‡	11	_
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Clanfield	1092			Lameroo	1		
Clare	*	_		Laura	*		-
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Coonawarra	*			Maitland	*		1 -
Coorabie	*		_	Mallala	1	10	1-
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Crystal Brook	*	\		Mantung	1093	_	-
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Daver port	*	_	! —	Meningie	*		; -
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Dowlingville	1090			Miltalie	‡	15	12
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Forest Range	#			Minlaton	*		_
Forster	+ +			Mintaro	1086	15	12
Frances	*		1 _	Mitchell	*	1	1 -
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T. TOOMTIR > * * * * * * * * *		1	,	H MICHAELOU DUULIN	1 4	1 11	1

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Narridy	+		- 1	Waikerie	*		_
Narrung	*			Warcowie	+ + + *		<u> </u>
Netherton	† ‡	_		Warrow	1 1		i —
North Booborowie	1 1	_	-	Watervale	+		-
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Ramco	1 T	1		TOTREMAIL			1

^{*}No report received during the month of June. + Formal report only received.

‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Dates of Meetings— July 12th and August 9th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

COOMOOROO (Average annual rainfall, 11in. to 12in.).

May 20th.—Present: 10 members and two visitors.
FARM BLACKSMITHING.—Mr. E. Berryman (Hon. Secretary) contributed a paper on this subject, and pointed out that by the provision of a small blacksmith shop on the farm, time and expense were saved. He preferred a portable forge; the fans gave a more even blast than the bellows. An anvil of from 1cwt. to 1½cwt. in weight was necessary, also a strong vice. Hammers, hot and cold chisels, punches, tongs, mandrills, and bolster might also find a place in the shop. Stocks and dies were essential. A drill, with different sized bits, was handy. coal, that which crumbled in the hand, and had a glossy appearance, should be used for fuel. When laying a fire, the cinders and ashes should be scraped away to leave a depression, exposing the mouth of the tue pipe. The actual space on the hearth occupied by the fire was comparatively small; the remainder of the surface, with its coal, acted as an insulator. Shavings, chips, or a few coals should be placed in the bed and lighted; some of the coal from the previous fire should be scraped on to that, then finally green coal, moistened with water, was added. green coal was placed at the back of the fire, and was gradually converted into coke. A clean fire was an essential. Iron, to be welded, should be sprinkled with borax, when just at a yellow heat, if there were a tendency to form scales. It should be raised to a white heat by means of a slow fire. He then proceeded to describe the method adopted in welding, and in tempering tools. An interesting discussion followed. Messrs. M. Avery, A. H. Cooke, J. Brown, F. Gregory, and the Chairman (Mr. N. S. Lillecrapp) suggested various uses for the smith's shop on the farm, including others being the shoeing of horses, plating ploughshares, &c.

SEEDING.—Members discussed the relative advantages of deep and shallow drill-

ing; the majority preferred shallow drilling, especially if the weather were dry. Members favored harrowing after the drill, and also when the wheat had reached

a height of 4in. or 5in.

HAWKER (Average annual rainfall, 12.22in.).

May 23rd.—Present: seven members.

POULTRY.—The Hon. Secretary (Mr. J. Smith) read a paper, detailing characteristics of a number of breeds and crosses which he had kept. Whilst for egg production he thought the White Leghorn the best breed, he was of opinion that for that district the progeny of the Black Spanish hen and the Plymouth Rock male bird was most suitable; and as a second choice, the White Leghorn hen and the Plymouth Rock rooster. Members generally were of the opinion that it paid the farmer to keep poultry.

HAWKER (Average annual rainfall, 12.22in.).

June 19th.—Present: 10 members.

HARROWING GROWING CROPS.—Whilst harrowing growing crops had been practised for a number of years, said Mr. W. G. Pyman, in a paper read at the June

meeting of this Branch, it was only of late years that it had become in any way His remarks had particular reference to his own district, but doubtless they would apply to a number of other places outside Govder's line. One of the chief objections raised against the practice was that it destroyed so many wheat plants, but that could easily be overcome by sowing 5lbs. or 6lbs. extra seed per Chief among the benefits were the destruction of weeds, checking the upward spindly growth of the wheat plant, and causing it to stool, and the conservation of moisture. In order to effect the last-named, it was advisable to harrow directly after a rain, thus checking the tendency of the earth to form a hard crust: implement used should be sharp, and have thin times; short, blunt-pointed harrows destroyed too much wheat, and did less satisfactory work. A paddock dirty with weeds could be harrowed in dry weather, and again immediately after rain. He suggested, by way of testing the effect of the operation, harrowing an area of crop after each rain until it had attained a height of Sin. or 9in., by which time it would have developed sufficiently to protect the surface of the ground against the sun. In conclusion, he mentioned that in the case of wheat sown dry, the ground should be harrowed immediately after the first rain that fell. Members were quite in accord with the opinions expressed by the writer of the paper.

ORROROO (Average annual rainfall, 13.42in.). May 20th.—Present: eight members and one visitor.

POULTRY.—In a short paper on this subject, Mr. J. C. Hagger urged the intending poultry keeper to procure stock from the best strain of layers procurable. White Leghorns were the best laying breed, and Black Orpingtons, Rhode Island Reds, White Rocks, and Plymouth Rocks were splendid table birds. Comfortable quarters and regularity of feeding were essential. Birds allowed free range in the day should roost in quarters under control. Cool water and dust baths were necessary, also shellgrit and charcoal. The morning feed should consist of a crumbly mash of bran, pollard, cut lucerne, and meat meal; green feed and a small quantity of wheat should be given at midday, and wheat at night. Eggs should be kept clean and gathered every day. A good discussion followed.

WILLOWIE (Average annual rainfall, 11.90in.)
May 19th.—Present: eight members and four visitors.

SEED AND FERTILISER DRILLS .- Papers on this subject were contributed by Messrs. S. McCallum and A. P. Greig. Mr. McCallum, after referring to different points connected with various makes of machines with which he had had experience, said that in purchasing a new drill he would select one with as straight a drive as possible, with hoes both narrow and small at the lower end, with as many notches as possible governing the depth of sowing, and with steel wheels, which were more satisfactory than wooden wheels in the climate of the district. A drill of 18 hoes satisfactory than wooden wheels in the climate of the district. A drin of 16 hoes or more should possess two raising levers, which would be found of advantage when working on uneven ground. Wheat and fertiliser boxes should be made of a wood most likely to withstand the effects of the weather, and have tight-fitting lids. Before affixing new points to hoes, he made a practice of tempering the bottom 2in. or 3in.; that, in cleared country, ensured a longer life for them. He preferred a drill of from 17 hoes to 22 hoes for that district.—Mr. Greig suggested a number of alterations which he considered would improve the seed drill. The steel points of the hoes should be pointed at both ends, and an extra hole would enable them to be lowered, and hence they would last longer. The points should be bolted and not riveted to the hoe; the farmer could then change the ends, or replace the points, without the necessity for taking the hoes off the drill or to the blacksmith. An increase in the size of the circle with the notches governing the raising or lowering of the drill would give a more accurate choice in regard to the depth of sowing. The addition of a small handgrip to the grain-box lid would prove an advantage. The manure-feeding wizards, for sowing small quantities of super, he said, should be made with about double the number of teeth. The teeth should be thick, and only about \(\frac{1}{2}\) in. in length. A wizard of that shape, he considered, could be driven faster, and would distribute the manure more evenly than the long-toothed wizard turning slowly. A good discussion followed. Mr. D. McCallum said harrow points were an advantage, as they placed the manure and grain close together. Mr. W. P. Foulis preferred the chain drive for seed and super., as it was more durable and of lighter draught, but it had the disadvantage of not being alterable quickly enough.

grounds of simplicity.

WILLOWIE (Average annual rainfall, 11.90in.).

June 9th,—Present: 11 members and two visitors. Motor Power on the Farm.—Dealing with this subject in a paper, Mr. B. E. Schmidt said that to the uninitiated purchasing an engine for the farm there were two rules which should serve as a reliable guide, viz., simplicity and maximum economy of fuel, together with strong, heavy, well-made bearings on the piston crank, with efficient lubricators. "Simplicity plays a very important part in any machine, and much more so in an engine," the paper continued. "The fewer parts there are, the greater the likelihood of those receiving their due attention, and of being understood, and until the user of an engine thoroughly understands the working of it, it is little use to blame the maker or the engine when something goes wrong, as ofttimes the most trivial thing may happen and stop the machine. It is then when practice or experience counts, for one is soon able to detect the cause. Personally I favor the petrol engine of 7½ horsepower, as a little power in hand is always better than leading to the full. A 71-horsepower engine running easy will consume less fuel than a 5½ horsepower loaded to its limit. Then, again, the bearings are not made to stand the continual maximum strain often imposed on the weaker engine. The 7½ horse-power engine will do all the work on the farm required of it. An engine to work really well must be stationary. Having it on a transport may certainly have the advantage of convenience, but that is more than outweighed by loss of power through vibration, more especially where the piston is horizontal. The placing into position of the engine is another important matter. Usually it is set down to drive the chaffcutter, and in doing so it should be placed about 18ft. distant, so that ample room is left to fix the crusher in a direct line, having the crusher so placed that the pulley wheel rises above the level of pulley wheel on cutter. This will not necessitate the removal of crusher. while chaffcutting. The circular saw may also be worked with the engine in this position by fixing two short shafts worked by bevelled cogs, so that the belt from the engine runs at right angles with the saw belt. By placing the sawbench the same distance from the shaft as the engine is from the cutter, one belt only will be required, and it keeps the wood as far as possible from the haystack." The same subject was also dealt with by Mr. S. G. McCallum, who mentioned that whilst there was little to choose between the horsepower and the motor in the matter of costs, and, in fact, in some districts the former was a less expensive power, yet on the points of speed and durability the motor scored. Once a person became thoroughly acquainted with the working parts of an engine, there need be little bother. important points to consider were—(1) There must be plenty of petrol and a clear passage through the inlet valve; (2) good compression, otherwise it was impossible to get full power; (3) a good spark from the sparking plug; and (4) the spark should be timed correctly. In some engines it was also necessary to correctly time the exhaust valve and the inlet valve, and also the governor. He then explained various means of getting at the seat of the trouble in the case of stoppages. Mr. A. Gray preferred the vertical engine; the horizontal engine wore in one place, and there was consequently a loss of power. The two-cycle engine was favored, on the

WILMINGTON (Average annual rainfall, 18.26in.) May 17th.—Present: 11 members.

THINGS THAT DO NOT PAY.—In a paper under this title, the Hon. Secretary (Mr. A. J. G. Benier) said:—"In presenting this paper, I have endeavored to give a few hints to farmers on things that do not pay; therefore I ask you to be lenient with me if I happen to be too straightforward and unfortunately rub you a little on the sore side. These are a few things that do not pay: It does not pay to let the farm implements, harness, and other perishable property lie out in the sun, rain, heat, cold, and mud, and to keep on paying bills for repairs and renewals, and to suffer the loss of time through the things being out of order when they are required. To purchase commercial fertilisers and allow tons of stable manure to remain idle in the yards, and have all its valuable properties leached out by rains and burned out by the sun. To grow wheat and hay for ever, with poorer crops each year, when there are many other things that can be grown or produced which will pay much better. To put off the preparation of land for a few weeks, because the ploughs or harrows need repairing, or the teams are tired and worn out. Keep things shipshape and take time by the forelock. To turn your stock out in winter

because you have no work for them to do. Always have enough work for animals to keep them out of mischief and pay for a good day's feed, and see that they get To sit by a roaring fire in the winter, while your cattle shiver in the fence corners, and the pigs squeal in their frantic efforts to get under each other for warmth. To lie in the shade during the summer, while your cows and other stock are enclosed in an open paddock, with nothing but a barbed wire to protect them from the heat. To cover all your land with grain crops and wild oats, and refrain from keeping sheep, horses, and cows, because there is no feed for them. close attention to your horses, cattle, and pigs, while you are working all the spirit out of your wife and children. To sell the best of everything to the town people and consume at home only refuse. To refuse to provide the wholesome comforts of life for the family, and then complain about the bills from the doctor and undertaker when disease and death results. To keep a lot of runts and scrubbers eating their heads off; these fetch nothing if put up for sale, whilst there is always a big demand for really good stock, which cost no more to breed and keep. To keep a lot of useless dogs about the place. To neglect the cultivation of vegetables and fruit. To use old-fashioned implements, because your grandfather did and prospered. To let stock get poor because grass runs low. If you cannot feed properly, sell. Last of all, it does not pay to be a non-member of the Bureau, because if you think that you know all that there is to know about farming, well, then, it behoves you to come along and impart your knowledge to those not so gifted.'

HOOKINA, May 23rd.—Sand Drift—A short paper on this subject was read by Mr. B. Sheridan. Mr. Kelly suggested that the drift might be obviated by ploughing furrows in squares over the ground. Mr. B. Murphy advised planting land likely to drift with trees or shrubs. The Chairman (Mr. D. Madigan) suggested ploughing with each second furrow of the plough removed.

WILMINGTON, April 11th.—An address dealing with the provisions of the noxious weeds legislation was delivered by Mr. C. H. Tuckwell, of the Advisory Board of Agriculture.

MIDDLE-NORTH DISTRICT. (PETERSBURG TO FARRELL'S FLAT.)

BLYTH (Average annual rainfall, 16.46in.).

April 15th.—Present: 13 members and two visitors.

Side Lines on the Farm.—Mr. F. C. Williams read a paper. Whilst the growing of cereals was the main source of income from the farm, sheep would be found the next most profitable factor. The farmer should have some well-framed breeding ewes. For wool production he preferred the pure Merino, and for marketing the Merino-Lincoln or Shropshire cross. No farmer should be without cows, for milkers, the Jersey, and for farm use, the Jersey-Holstein or the Durham. The pig should also receive attention. The Yorkshire-Berkshire was a good cross, and the farmer should breed sufficient for his own use. Fowls, turkeys, and geese should also be kept. The White Leghorn was best for egg production, and crossed with the Wyandotte produced a typical farm bird. That cross, or the pure Wyandotte, would repay the little attention given them.

BLYTH (Average annual rainfall, 16.46in.).

May 20th.—Present: 17 members.

Mr. J. S. McEwin, in a paper entitled "Specialising," dealt with several phases of farm activities, and urged the need for thorough attention thereto. The farmer must sow good seed on well-worked land, he said, and the dairyman, besides giving especial attention to breeding and selection, must properly care for his stock. When sowing wheat, the seed should be selected according to adaptability to the district, and should be of good sample, free from all foreign seeds and rubbish. The latter

could be attained by the use of the winnower or grader—except in the case of barley—the simplest means of removing that being to pull the heads from the growing crop. Smut could be safeguarded against by pickling the seed in a 10 per cent. solution of bluestone. Fallow should be ploughed not later than the middle of August. The harrows should then be used, and the cultivator to destroy weeds, after which the harrows should again be used, and also after every rain. Late fallowing at times resulted in seeding being delayed until wet weather was experienced, with the result that it was difficult to destroy the weeds. Members after discussing the subject, agreed that early fallowing was best for that district.

MINTARO.

FALLOWING IN THE MINTARO DISTRICT .- In a paper on this subject, Mr. David Kelly said the main object for the farmer to keep in view when fallowing in that district, with its good rainfall, was not the conservation of moisture, but the sweetening of the soil by the sun. They could get better results by fairly rough ploughing, and leaving the land open until September or October, then thoroughly breaking it down, and leaving an open surface. The practice he recommended was as follows:--"To get as great an exposure to sun of both winter and summer, he would, where possible, break the land in autumn, say, February, March, April, with any implement that would give a good rough surface. The rougher the better for letting through the winter's rain and avoiding the sodden surface. Cultivate thoroughly in fine weather in June and July and August. Then use a good set of scarifier harrows to produce a fine open surface, well beaten down on to the under soil. In dark open soils the best fallow could be made with the cultivator and the sacrifier harrows. The writer had experience of black land that was fallowed four times in succession without ploughing, and the crops were excellent each time, and the land improved in condition. Where the autumn working is impossible the land must be worked as early as possible after seeding. In the biennial system practised on most small farms, it is not necessary always to use the plough. It is often better to work twice with a cultivator than once with a plough, and it is also often better to give the land two turns with scarifier harrows than once with a cultivator. The writer is a strong advocate of the scarifier harrows, fitted with steel shares that can be quickly changed. The constant use of these through the spring and early summer will produce ideal fallow. Four good harrows and eight horses makes a good mark in a day's work. Constant working at shallow depth is preferable to deep working at long intervals. It is preferable to fallow on a bare surface rather than to attempt to work stubble and other refuse into the land. slight benefit that ploughed in straw may give in the way of humus is more than counteracted by the risk of takeall and the hindrance to subsequent cultivating. On new land or land fairly free of rubbish it might be possible to grow a crop of late-sown barley on land ploughed in July, and then the crop fed off bare with sheep in October, in time to break the surface before the summer sets the ground too hard. Where this could be done it would add to the profit of the small farmer by enabling him to keep some sheep, instead of having all his land either crop or bare fallow."

NANTAWARRA (Average annual rainfall, 15.90in.). May 18th.—Present: nine members.

By-Products of the Farm.—An instructive address on this subject was delivered by Mr. F. J. Sutton, who referred to the necessity for farmers to give attention to products other than wheat. He suggested that the farmer should build up a flock of Merino sheep. The ram, he said, could be allowed to run with these the whole year round. Attention should also be given pigs. Of these he had found the Middle York most profitable; Berkshires, which he had also tried, had small litters. Poultry would also be found to return a good profit, and he discussed the merits of different breeds and crosses. A good discussion resulted, in the course of which a number of questions were asked and answered.

RIVERTON (Average annual rainfall, 20.48in.). May 15th.—Present: 14 members and two visitors.

SEEDING OPERATIONS.—Mr. C. A. Smith contributed a lengthy and exhaustive paper dealing with the seeding operations. He emphasized the need for securing a firm seed bed, and made several suggestions in regard to the working of land that

had not been handled before the last harvest. The wheats which he was putting in this year were Yandilla King, Field Marshall, Baroota Wonder, Improved Bluey, King's, Red, and Viking; early varieties at the rate of 14bush. per acre, and late 1bush. When stock were put on to a crop to feed it down, they should be kept on the move, and care should be taken to keep heavyweight animals out of the crop, he said. A fair dressing of super. was 100lbs. per acre. When wheat reached a height of from 4in. to 6in. it should be gone over with the roller. Oats and barley should be put in before the wheat. Algerian oats mixed with a late variety of wheat would be found to yield excellent hay. Various other topical points were introduced, and the paper was followed by an interesting and informative discussion.

SADDLEWORTH (Average annual rainfall, 19,69in.).

At the February meeting of the Branch, members dealt with the question of thatching haystacks, and reported on the harvest results.

March 17th.—Present: seven members.

TARRAGON WHEAT .- Mr. Townsend reported very favorably upon this wheat, especially upon red ground up the Gilbert Valley. He spoke of confining his varieties to Federation and Tarragon in the future as the two best wheats in his experience.

April 20th.—Present: nine members.

WHEAT VARIETY TESTS.—Twenty named and three selected varieties, grown by Eric Kelly, Undalya, were exhibited. These were well grown, cleaned wheats of even grade and good quality. While for grain the best six were:-Federation, 36.52; Marshall's Hybrid, 35.31; Golden Drop, 34.2; Thew, 32.32; Late Gluyas, 32.22; and Red Tuscan, 30bush. 44lbs per acre. Bunyip, with just under 1 ton 1cwt. of hav and 15bush. 2lbs. of wheat was the lowest on the list for both straw and grain return this year; this wheat was tenth in yield of straw and second with 23bush. of grain the previous year. Zealand Blue, top this year as a hay wheat, was second last year, being beaten by Florence with 43lbs. per acre higher return. Federation leading this season was away down at the 20th position the previous season, with a return of under 16bush. per acre. The returns show distinctly the difference in the two seasons, and the suitability of varieties to the season. Thew proved the most consistent cropper, and with Zealand Blue the best for hay.

COST OF GROWING A CROP OF WHEAT.—Mr. J. H. Frost read a short paper, giving figures for wheat-growing during the past season, 1915-16, for cropping 400 acres. The expenditure side, including hay chaff £500, labor £350, manure £100, cornsacks £105, seed wheat £175, depreciation on live and dead stock £50, and sundries £33,

totalled £1,313; the cost of growing this crop coming to 3s. per bushel.

May 26th.—Mr. F. Snell contributed a paper in which he refuted the idea that changes of the moon affected the weather. He lucidly explained the reason for the apparent changes in shape of the moon, and with the aid of a diagram illustrated the different quarters.

BUNDALEER SPRINGS, May 17th.—Horses on the Farm.—Mr. P. Kerin in a paper outlined briefly the characteristics of the Shire, Suffolk Punch, and Clydesdale, and mentioned the importance of breeding from good dams. He advised handling foals whilst they were young, breaking them when two and a half years. Care and system were necessary in feeding. Mr. J. Travers favored the pure-bred animal, whilst Messrs. O'Dea and F. C. Giles preferred the draught with the strain of blood stock.

PORT PIRIE, June 10th.-Mr. F. Jose read a paper on the care of farm implements, and a good discussion followed.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

LEIGHTON (Average annual rainfall, 16in. to 17in.).

May 11th.—Present: 13 members.

KILLING AND CURING PIGS.-Mr. T. P. Goodridge read a paper on this subject. The pig should be ready for killing in May, he said, in order that suitable weather conditions should prevail for drying. The animal should be caught and handled

quietly. A pig of from 60lbs, to 80lbs, to be killed should be sat up; the butcher should grasp the animal under the chin with his left hand, pull the head back against his legs, and with the right hand insert the knife, and draw it to the chiu; the animal then being freed. A larger pig should be turned on its back, and an assistant should straddle it, grasping one fore leg in each hand. The butcher should then pull the head down with the left hand, and stick as before described. A very large pig should be roped to a post by the near hind leg, turned over on the right side, and have a short stick placed in its mouth, the butcher placing that behind his right leg, his left knee behind the beast's ear and grasping the left foreleg with his left hand. After being stuck, the animal should be allowed to regain its feet. For scalding handy sized pigs a tub was preferable; two buckets of boiling water to one of cold made a good scald. As soon as the hair would come off the ears, the carcass should be turned so that the feet would be in the tub. When clean, the carcass should be placed on a board, and the few remaining hairs' should be shaved off. For finishing a scrubbing brush would be found less liable to mark the skin. In favorable weather, the carcass could hang for a couple of days, to relieve the meat of animal heat. One method of salting was to sprinkle a small quantity on the meat as soon as it was cut up, after which it was allowed to remain for a day or two. When it was being placed in the bin a flitch of bacon, rind downward, should go at the bottom. That should be covered with coarse brown sugar and plenty of salt; another flitch should be added; then the two hams, each part being duly dressed as advised. Rubbing the salt into the bacon had a tendency to harden the meat. Every third day, or thereabouts the position of each piece should be changed, a further quantity of salt being added. About a fortnight or three weeks afterwards, the time varying according to the size of the pigs, the flitches should be taken out, the hams being left slightly longer, according to the size. They should then have the salt washed off, be allowed to drain, dried in a cool place, and hung in a kitchen or other suitable place to finish drying. The plan of packing bacon and hams in a chest was not to be recommended, as the practice encouraged weevil. Another good plan, adopted in America, was to sprinkle a quantity of salt over each layer, in the proportion of 8lbs. to every 100lbs. of pork, until the barrel was full. After that water was added to fill the interstices and the whole was completely covered. When open barrels were used, it was necessary to use weights to keep the pork under the brine. He made a practice of using 8lbs. of the best salt and 2lbs. of brown crystal sugar, well mixed, to every 100lbs. of pork. Coarse salt and rough brown sugar made too much waste, were very slimy, and gave the meat the appearance of being waterlogged. Saltpetre gave the meat a good colour, but made it hard. He placed the barrel in the shade, covered the bottom with salt, just covered the meat with the mixture, placed the hams in the bottom, and the other pieces on top, and poured over the whole enough brine, sufficiently strong to float an egg, to cover it. The meat should be turned about once a week. The barrel could be covered with a piece of hessian. When dry, the meat could be hung in calico bags, which had previously been dipped in boracic acid, and which had been put on whilst still wet.

ROSENTHAL.

May 17th.—Present: 21 members and four visitors.

Wheat.—In a paper dealing with this subject, Mr. G. H. Stevens (manager Turretfield Farm) referred at length to the important place occupied by wheat in the primary industries of South Australia, and quoted statistics showing the relative place of Australian production of that cereal in comparison with the output of other countries. Whilst climatic and soil conditions precluded the possibility of the average yield reaching those of England and Belgium, there was, nevertheless, room for improvement. "While countries possessing cold climates can produce high average yields," the paper continued, "the quality of their wheats, from a milling point of view, is not so good, generally speaking, as that of wheats which mature in hotter climates. Hence the strong demand in the English markets for the harder wheats of Australia, the United States and the Argentine, for blending purposes. Australian wheat in particular has such a high reputation for the color of flour it yields, as well as for its general good milling qualities, that it will always find a ready market. As wheat is undoubtedly the most important cereal, the question of its origin has arisen from time to time, but so far the matter has

not been definitely solved. Acclimatisation plays such an important part in plant life that it is not surprising to find that the wheats that do best here are varieties that have been evolved in our own country. Federation, Comeback, Yandilla King, Marshall's No. 3, Triumph, White Tuscan, Gluyas, and a host of others the names of which are quite familiar to South Australians, and which are the varieties most commonly grown in the State, are all wheats which have been bred in Australia. We sometimes read of wheat yielding enormous returns in one country, yields that to us seem almost fabulous, yet when we procure seed of this same variety we are often disappointed to find that the wheat is not even as prolific as our own standard varieties. Climate and soil, however, are important factors in the selection of varieties of wheat. Wheat that yields a good return in a cold country is more likely than not to be an utter failure when transferred to a hot climate. Recently a sample of wheat that yielded high returns in New Zealand was secured and tried in South Australia, both at Parafield and Turretfield. Even after the variety had been given ample time to become acclimatised, it did not justify itself. partment of Agriculture has at different times had hundreds of different varieties of wheat obtained from all parts of the world for testing purposes, but almost invariably they have failed in themselves, though they have proved of value for crossbreeding purposes. In Australia, where the bulk of stable feed for horses, etc., consists of wheaten hay or chaff, it is not surprising to find that we have a classification of wheats in regard to their value—(1) As hay wheats, (2) as grain wheats, and (3) as dual purpose wheats, that is, varieties that are suitable for where so, and (o) as dual purpose wheats, that is, varieties that are suitable for either hay or grain. The wheats more commonly grown in South Australia may be classified as follows:—Hay—Huguenot, Medeah, Firbank, Correll's No. 7, Silver King, Majestic, Gallant, White Tuscan. Grain—Federation, Bayah, Bunyip, Gluyas, Comeback, Cedar, Thew, Cumberland. Dual~Purpose—Triumph, Yandilla King, Marshall's No. 3, Queen Fan, Leak's Rustproof, King's Early, Crossbred 53, White Essex. Then, again, owing to the vast expanse of territory and the 53, White Essex. Then, again, owing to the vast expanse of territory and the varying climatic conditions, it has been found expedient to make a further classification of our wheats according to their time of ripening. Generally speaking, the classification is as follows:—Early—Firbank, Cumberland, Bunyip, King's Early, Thew, Golden Drop, Gluyas, Florence. Mid-season—Federation, Bayah, Queen Fan, Leak's Rustproof, Comeback, Triumph, American No. 8. Late Mid-Season—Yandilla King, Marshall's No. 3, Crossbred 53, Lott's, White Essex, Company of the Com monwealth, Correll's No. 7, Genoa, Cedar. In our most northern agricultural districts it is essential to sow varieties of wheat that will mature in the early part of the summer in order to avoid the harmful effects of dry north winds and red In the central districts we can allow ourselves a wider range of varieties. Experience has shown that in some seasons the early wheats give better returns than the late varieties, and vice versa. Hence, if we sow a fair proportion of early, mid-season, and late wheats, if the season prove at all favorable for wheatgrowing, one or other of the varieties sown will give a reasonable to good return. If red rust should appear late in the season, there is the chance that the early varieties will be too far advanced for it to do them serious damage, while the late varieties The foreign wheats tried at Turretfield often possess might suffer severely. characteristics which would be of great value if they could be incorporated with the qualities of our local wheats, and this is one of the objects of cross-fertilisation. Some of the Indian varieties, for instance, are extremely early—a characteristic of importance for wheats to be grown in our northern areas. A few American varieties are especially strong flour wheats, a quality that is lacking in some of our standard crops. Wheatbreeding is a class of work that can only succeed within limits, and only a small proportion of new strains ever get to the field stage; but even that small percentage is worth striving after. Federation, Comeback, Bunyip, Florence, Thew, Bayah, Genoa, Cedar, Cumberland, Bobs, Firbank are some of the late Mr. Farrer's wheats, and the fact that most of them are widely grown in different parts of the Commonwealth is a sufficient testimony as to their value. Another man who has done much for South Australia is Mr. R. Marshall, who bred Marshall's No. 3, Silver King, Triumph, Yandilla King, Majestic, Gallant, Marshall's Pride, and a number of others. Cross-fertilisation is, however, only one method of improving wheats; that work requires years of labor and patience, as well as some expert knowledge, if it is to be successful. Another method is improvement by means of selection—that is, to select from the ordinary wheat crops the best plants which possess all the best characteristics of their respective variety. This is work that could be profitably undertaken by any

farmer. It is a recognised fact that wheat, if it is grown year in and year out without any attention or selection, gradually deteriorates, and becomes less prolific. Hence the reason a change of seed of the same variety so often gives such good results. It is, however, a debatable point whether it is the sowing of seed obtained from another district that is responsible for the improved yields, or merely the use of a better quality of seed. In New South Wales it has been found that good graded seed sown on a farm one year, and then resown the next year, gives better results than graded seed of the same wheat obtained from the Experimental Station. This seems to point to the fact that the seed, after having been grown in a locality for one year, has become acclimatised, and therefore yields better returns than seed sown in a new locality for the first time. I believe farmers would do well to devote more attention to this work of selection. There is really very little labor attached to it, and the results, I feel sure, would prove satisfactory and encouraging. grading of seed wheat is also highly beneficial; most of the weeds and foreign seeds are culled out, and a more even germination and more even crops are secured, and the small, shrivelled, and cracked grains are saved for the pigs and poultry, instead of being wasted on the land."

YORKE PENINSULA DISTRICT. (TO BUTE,)

DOWLINGVILLE (Average annual rainfall, 13in. to 14in.).

May 16th.—Present: six members and three visitors.

Handfeeding Sheep.—The Chairman (Mr. J. A. Pheps), in reading a paper on the subject, submitted the following statement of actual returns, which he had secured last season, in regard to the purchase and handfeeding of 40 sheep.—Outgoings—40 sheep, at 10s. 6d. per head, £21; 1½ tons hay chaff (for eight weeks), at £6 per ton, £9; 1½ tons hay (for 18 weeks), at £6 per ton, £9; shearing 40 sheep and 9 lambs, 12s. 3d.; total, £39 12s. 3d. Incoming—320lbs. wool, at 8d., £11 13s. 4d.; 27lbs. lambs' wool, at 4d. per lb., 9/; value of sheep and lambs at 25s. per head, £61 5s.; a total of £73 7s. 4d., showing an excess of income over expenditure of £33 15s. 1d. The sheep were purchased in January, 1915, and were given hay chaff of 30lbs. in the morning and 30lbs. in the evening. In two months the wethers were fit to kill. He expressed the opinion that if farmers fed their sheep on hay chaff, say, from April till the end of July, not only would the green feed get a better start, but the carrying capacity of the holdings would be renewed, and the value of the land from a cropping point of view enhanced. The method he recommended was to keep the flock in a small paddock of two acres or three acres whilst they were being fed. Feeding twice daily was advised, as the sheep could then be kept in overnight. The feeders he used were made from an old iron tank; old drill boxes could also be adapted. Wood or iron was more satisfactory than bagging, on account of the latter moving with the wind.

MOONTA, May 13th.—Mr. W. B. Stacey contributed a paper in which he dealt with the effect of a protective tariff on agricultural production.

WESTERN DISTRICT.

MOUNT HOPE, May 19th.—Mr. J. Colbert contributed a short paper, in which he recommended the use of a 1 per cent. solution of bluestone for pickling wheat. In the discussion which followed, members described various methods of pickling which they adopted.

YEELANNA, May 20th.—Mr. J. Cronin read a short paper dealing with the care of harness, which, he said, should be well cleaned and oiled twice each year. New collars should be soaked in water before being used; that would insure a better fit. Members were divided in opinion as to the wisdom of that practice.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

BORRIKA.

May 13th.—Present: 18 members and four visitors.

THE FINANCE OF THE FARM .- In a paper on this subject Mr. Seary said:-"There are certain general principles which should be followed as closely as possible to make a permanent success of our holdings. While the Government come to our aid with Drought Relief and the Advances to Settlers' Board, grant loans liberally on improvements on the holdings, some farmers are inclined to drift along in false security because there happens to be enough money in the bank to carry on to the The average mallee farmer seems to launch out into this new following harvest. country with insufficient capital to make a satisfactory start. The result is that implements have to be purchased from the merchants on the hire agreement system at high rates of interest, because the implements themselves are the only tangible security, and in many cases loans have to be obtained from the Advances to Settlers' Board as soon as improvements begin to appear. This means high running expenses and a large outlay for interest each year, and also for a sinking fund for Now, in planning the operations for any one year it is necessary to take into account all payments which have to be actually made during that year and all charges which ought to be made, but which do not necessitate taking money out of the farm, and then to sow sufficient grain to cover everything at the average price and yield for the district. Necessary payments are interest and sinking fund on mortgages, interest on drought relief, and payment of same when deprice and yield for the district. manded, house and personal expenses, promissory notes for machinery, seed, super, and horse feed, wages for labor employed, insurance premiums for fire, stock, and workmen's compensation where labor is employed, and a sufficient sum for general expenses, bags, twine, blacksmithing, repairs, &c. The other class of payments which need not be actually paid, but must be taken into account when consider-The other class of payments ing whether the farm is working at a profit, are wages for self above actual necessity, depreciation on stock and implements for the first few years, and interest on money used as capital on the farm. When these two classes of expenditure are put together it is then possible to determine how much revenue has to be made off the farm to balance accounts and, working on the average of price and yield, the acreage necessary to be sown to bring in that revenue, and if a sufficient area cannot be sown, other employment must be obtained to make up the deficiency. if the yield or price is above the average a reserve fund can be built up and still be used on the farm for making improvements, and if the season is below the average, then wages in full for self, depreciation and interest on own capital can be carried over, not being actual money payments out of the farm; and when necessary, when it is a matter vitally affecting the State, in a case of drought, the Government seem to step in to tide the farmer over the next season. While farmers each year work on these lines, taking a careful, moderate estimate of average yield and price, success must come eventually. Always in these years of war and drought and just as much in ordinary years, the strictest attention must be paid to economy. On the farm, more so than in any other business, waste occurs which can be prevented—machinery and harness not cared for, bags left lying about as food for mice—to give an example or two. Now economy does not mean "not spending money," but money spent wisely on necessary objects. If an extra horse in the team means a bigger area under cultivation with the same labor, or if an up-to-date implement means a saving in harvesting expenses, then it is economy to purchase them, providing the capital is available, or if sufficient capital is not on hand, then to obtain them on extended payments, provided always that the gain by using them is more than sufficient to pay the extra money involved in obtaining extended payments. It is a wise plan for farmers to make some attempt at bookkeeping; nothing elaborate, but as simple as can be, so that it is possible to know just what each branch of the farm work is costing—to know how much per acre ploughing costs, and drilling and harvesting, then if the cost seems too high, a way must be found to reduce it. Everything of an insurable nature on the farm should be insured so as to minimise risks as much as possible, especially in our earlier years. It is easier to prepare and sow an acre or two extra to cover insurance premiums than to find fresh capital to replace mares lost through foaling, or houses and sheds burnt down. Wheatgrowing in itself is quite sufficient risk without the risk of When farmers are strong financially and carry plant and stock and buildings.

reserves, then it may be possible for them to do some of their own insurance, but near the beginning it is very wise to hand over risks where possible to the insurance companies. Farming is a business, and must be treated as such, and must be understood just the same as any other business. Speaking generally, then, if farmers arrange their areas under crop so as to bring in sufficient for the year's working expenses working on the average of prices and yields which the method of cultivation justifies, and are prepared to look for outside revenue if bad seasons come before sufficient good ones give a chance of putting by a reserve, then there is every reasonable chance of success.''

CLANFIELD (Average annual rainfall, 16in. to 17in.). May 20th.—Present: 10 members and one visitor.

Mr. A. J. Hammat contributed a short paper. He recommended the division of the farm by means of six-wired fences into at least three equal-sized paddocks, the homestead being situated at the adjoining corner of these. One paddock should be fallowed and carry sheep; a portion of the second (last year's stubble) should be burnt, cultivated, and seeded to oats, for hay. The remainder of the paddock could be divided off by a temporary fence and could carry the stock. The third paddock, under grass prior to being fallowed, should provide for the sheep required on the farm. Members generally agreed with the opinions expressed in the paper. Messrs. Orwell and Marshall drew attention to the danger of sand ridges drifting if they were worked too nuch.

HALIDON.

May 17th.—Present: 10 members and four visitors.

FARM BLACKSMITHING.—The following paper was read by Mr. C. H. Russell:— "We have all of us experienced at one time or another the inconvenience caused by some small breakage on an implement, which necessitated a visit to the blacksmith, if fortunate enough to have one locally; if not, the delay in sending for a new part is most annoying where one is in the middle of seeding or harvest, as the case may be. Again, how often do our implements go into the paddock inefficient, for the want of some minor repair, such as twisted tines on a cultivator or blunt shares on the plough, or, maybe, patched up with 'cockie's wire.' A few tools and some knowledge of how to use them, therefore, become invaluable. For those who intend to make a start at blacksmithing it is better, although not absolutely necessary, to have a workshop. Much useful work, however, can be done in the open. As a rule the workshop is combined with a carpenter's shop, but care should be exercised in placing the anvil and forge as far from the bench as possible, for there is always the danger of sparks igniting the shavings or an old piece of bag. A shed, -6ft. x 12ft., and open to the east, if possible, is all that is necessary. In the selection of equipment the first essential to consider is the forge, the most convenient being one with a rectangular hearth. Such a one costs about £7; but a very suitable forge, with a round hearth, can be procured for £4. Then comes the anvil, costing about £2 per cwt.—nothing lighter than a cwt. should be used. Here, again, I have seen much useful work done with simply a piece of railway iron, about 18in. long. It is necessary to have some means of boring holes; the best is to have a small machine, which costs 35s., but a cheaper and a useful tool is the 'swing brace,' which consists of a top and bottom bracket; a hole is drilled and tapped close to the end of the top bracket for the reception of a bolt, to apply pressure to the drill. The swing is made from 1½in. iron, and a tapered hole punched in one end for the reception of the bit, and a centre made in the other end to receive the bolt which applies the pressure to the drill. A vice, of course, is an essential on the farm, even if one does not intend to take up blacksmithing. The next consideration is tools, of which some few are necessary; but if sufficient skill is attained, quite a large number can be made. For a few shillings one can purchase the following tools, which are all necessary to begin with: -A hot and cold sett for cutting hot or cold iron; an anvil cutter for cutting small sizes; a hand hammer, a useful one, weighing 1½lbs.; a sledge hammer, say, 10lbs.; a hand punch and centre punch; a brass rule; three pairs of tongs; and a few files of various shapes. Other useful tools, but rather expensive, are a swedge block and stock and dies. The materials used in blacksmithing are wrought iron, mild steel, and spring steel, and in order to acquire proficiency some knowledge of their structure

is necessary. Iron is fibrous, like timber, so that when it is drawn out a welding heat is necessary, or the fibres become separated. To joint a piece of round iron it is best to draw it out square, and then round off the corners. Mild steel is practically iron, but is produced by a different method; it is granular in structure, and is stronger than wrought iron, but more difficult to work; it will not split like iron. Spring steel is produced by chemically combining carbon with iron. It also is granular in structure, but very difficult to work—for the beginner best left alone. It is necessary to obtain correct temperature before removing iron from the fire. Commence hammering immediately on removal—do not look for the hammer, do that before. Before welding correctly stay the iron. Do not try to weld spring steel. When welding, hammer gently at end of searf, gradually increasing weight of blows. Keep fire clean of dirt and clinker. When bending iron at right angles, heat only that portion required to be bent. This can be done by cooling in water on each side of the bend. Do not square off the outside of a bend-it is stronger Tempering reduces the hardness of steel and produces an elasticity. Most tools to be tempered should be made as elastic as possible, at the same time having the point hard enough to produce a cutting edge. Steel when heated to a dull red and cooled will show various colors on its surface; as the heat is conducted one will notice first a yellow color, then dark straw, brown, purple, and varying shades of blue. The purple shade is the color that should be shown when tempering chisels, punches, picks, &c. When a harder surface is desired use the straw color. Do not plunge the metal when tempering into cold water-it should be lukewarm. To temper a cold chisel, heat about 2in. of the point to a dull red, plunge about 1in. of heated portion into lukewarm water, slowly raising about ½in.; leave it immersed for several seconds, then draw it out and clean the surface. One can then note the colors rising to the surface; when the purple is showing plunge into the water again and cool right off. When grinding do not place too sharp an edge on the tool, or it will not stand to its work, no matter how well tempered.'

MANTUNG.

May 25th.—Present: seven members and one visitor.

STOCKING THE MALLEE FARM.—Mr. E. Tonkin contributed a paper, in the course of which he advised the person commencing farming to purchase only that plant that was necessary to effectively work the land. After the land had been satisfactorily tested, say, for four seasons, the stock of implements and machinery could be increased by the addition of a power plant, chaffcutter, cornerusher, &c. The medium draught was the most suitable for the mallee farm, and the farmer was advised to breed sufficient stock to replace the horses as they reached an age of 12 years. As the mallee farm was gradually brought under cultivation, attention could be given such lines as sheep, cows (sufficient for home requirements), pigs, and poultry. A lengthy discussion followed, in which consideration was given the question of purchasing, marketing, and feeding sheep.

MURRAY BRIDGE.

June 12th.

PIG-RAISING.—Mr. W. Pearson read a paper. He said:—'It is of vital importance to get good stock from which to breed. The hog should be pure. I strongly recommend either Berkshire or Middle York. The principal points in a good hog are good straight legs with bone not too coarse, feet on the small side, short dished face and jowl, short ears, straight back, tail high up, ribs well sprung, not too thick through shoulders, and long body. That is for either of the above breeds. In regard to sows, I favor the large Essex, not what are known as the large Black, as they are too long in coming to maturity, and when fat are too heavy for market requirements; and the little short-nosed Essex is only suitable to breed porkers. In selecting sows for breeding I would not advise anyone to go for what may be termed high-class pigs; nor yet being over scrupulous about their being pure bred. A grade sow will often be a better mother and generally more profitable than a pure-bred. She should be fairly large, stand well on her legs, have a long and deep body, not less than 10 teats (12 preferably), good deep hams, with tail well set. One should not be too particular about the head. A dash of either Poland-China or Tamworth blood will not hurt, as either of these breeds increase the length of side or middle, which is very desirable in a bacon pig. The

hog should be kept by himself, fed liberally, but not made fat. He should have a little corn and some sloppy food, or mangolds, or potatoes (raw), and room for exercise. He will be fit to start work at nine or ten months. If he should be inclined to be spiteful, give him a good mallee stick across the snout. If this habit is not checked early it is apt to become troublesome. The sow during pregnancy may be fed the same as the hog, but care must be taken not to overfeed her for a day or two before she farrows, and she should get nothing but a drink of scalded bran for from eight to 12 hours after. If she is of a quiet disposition, it may be advisable to take the young away and put them in a box secured in a corner of the sty, but they must be allowed to suck every three or four hours. If the sow is at all excited and irritable, it is better to leave them with her. Bran mash is all she will require for the first three days, with a little milk if available. After that pollard and milk may be substituted for bran, the quantity being gradually increased for a fortnight, after which she may be given all she will eat three or four times a day. As soon as the young ones begin to drink, hurdle off a corner and put a wide shallow trough in it for them to drink milk with a little pollard. Castrate them at a month old. Wean at eight or nine weeks, and feed liberally after, not less than four times a day for two or three weeks, but be careful not to give them too much at a time, but just as much as they will clean up. them consistently until six months old, when they should be about 120lbs. to 140lbs. dressed weight, which is about the ideal bacon pig. Almost any corn is suitable for pig feeding. Peas given whole and dry give good results, but I always give them a fortnight on pollard, mixed with milk, if it is on hand, to top them up; if not, water must be used and good results will be obtained. It should be mixed so that it will just run along the trough. I prefer wooden troughs, cut out of gum logs, about 12in. or 15in. in diameter, 8ft. to 10ft. long. Cut the trough about 9in. wide and 8in. deep, with the ends nicely sloped to facilitate cleaning. They can be easily swept out with a broom, which cannot be done if the ends are cut straight down. Wheat is better soaked; barley crushed and soaked; oats come last for pig feeding, but may be used with advantage as a change. I give pollard and milk pride of place. If green fodder is available, and is to be fed to pigs in the sty, the most economic way is to make a rack along one side of it by placing a log about 9in, thick on the floor, bore 1½in, holes about 4in, apart sloping outward, in order to give a rack about 6in, wide in bottom, and 18in, on top; this will hold a lot of feed, and they will draw it out in small quantities, and waste very little, especially if it is pressed down fairly tightly. For feeding in the trough the front of the sty should be of posts and, say, four good rails. The second rail from the bottom should be fastened on the outside of the post and nailed or wired on; then a sheet of plain galvanized iron should be put down between the outside rail and the bottom one, and nailed to both, and also to the edge of the trough. Food can then be poured into the trough the whole length without the possibility of waste or crowding of the pigs, as occurs when it is poured into the end of trough obtruding through the front, a practice generally adopted. Unless pigs have comfortable quarters the best results can never be obtained, no matter how well they are bred and fed. If they are not warm and dry in winter and cool in summer they will not thrive. I think about six pigs are enough to keep in one sty, and a good sty can be made cheaply thus:—Front and back posts, 6 x 3, and four rails 8in. wide; or, better still, sawn timber 8in. x 1½in.; size of sty, 12ft. x 12ft., thus allowing 9ft. for trough, 3ft. for door in front. Bed place in one back corner about 6ft. x 6ft., raised 6in. above the outer floor, which should be of brick or concrete, and drained to the back; the bottom rail about 3in. above floor. The roof should be 6ft. or 7ft. high in front, and 5ft. or 6ft. at back. By using longer posts in the back and partition fences one extra post will be needed to carry the roof, which should be composed of a good layer of thatch or reeds, about a foot thick; then 3in. x 2in. purlines wired down tightly, and galvanized iron nailed on. It also advisable to put a door in all the partitions, and also a race right along the front, no matter how many sties there are. This should be 3ft. wide, so that when one of the doors is opened it will close the race, and thus enable one to draft and pen the pigs without trouble. Make a gate at one end, and ramp for loading at the other. If the pigs are shifted from one pen to another occasionally they will be much easier loaded than if left in the sty in which they were put at first. A few smaller pens for different purposes will be found handy, and a small paddock or paddocks where rape or other suitable fodder could be grown. If netting is used, secure the 12 x 14 gauge x 14 in. mesh. This will stand against pigs much better than the coarse netting and 3in. mesh. As before stated, ordinarily 120lbs. to 140lbs. dressed weight is about the correct thing for a baconer, and 60lbs. to 80lbs. for a porker. But in either case make them prime, as it is the quality that tells. It is a grievous mistake to rear good forward stores, and then market them, as in most cases another month or six weeks' good feeding would double their value. If the weather is hot too much care cannot be taken in loading or driving to market, as a fat pig is very easily killed if overheated. It is a good plan to have a raised frame on the vehicle over which hessian or green boughs can be placed for shade, and if pigs show signs of distress they can be cooled down with water; but it must be done before they are too far gone, or it is very likely to hasten the end; but with proper care a healthy pig can be safely marketed in almost any weather. One showing signs of croup or shortness of breath had better be left for favorable weather.' At the conclusion of his paper Mr. Pearson answered many questions on the various aspects of pig-raising in a manner which gave general satisfaction.

PINNAROO (Average annual rainfall, 16.74in.).

April 14th.—Present: 15 members.

POULTRY ON THE FARM.—In a lengthy paper on this subject Mr. B. L. Harfield gave a number of useful hints to the beginner in poultry keeping. He enumerated the different breeds, with their outstanding characteristics, and outlined plans of houses suitable for farm conditions. In regard to provision for feeding, he mentioned that if fed entirely on wheat 1½bush. per adult bird per annum would be sufficient. If mash also were fed, each fowl would require ½bush, wheat, 1bush, pollard, ½bush, bran, and about 60lbs, of chaffed green feed. If meat meal were fed (and meat in some form was necessary), 5lbs, would be ample. Each bird would also require 25lbs, of sharp grit, or gravel, including charcoal grit and shell grit. For green feed, lucerne was best, but as that yielded little after April, berseem should be sown in March. He concluded with the opinion that poultry constituted an undoubtedly payable investment.

SANDALWOOD.

May 20th.—Present: 16 members and seven visitors.

MALLEE SHOOTS.—In a paper on this subject, Mr. J. W. Collins dealt with the urgent necessity for keeping the plough and fire rake going at the proper time. These two implements were the only effective means of getting rid of the stumps and destroying the shoots. If there were no stubble, as on fallow land, one had to fall back on the slasher and if the shoots were extra thick, after being cut they should be fire raked or raked up in rows and burnt. Members were agreed as to the beneficial results accruing from a good stubble burn in scorching the shoots, and the benefit to the crop following, and considered it necessary to cut shoots as soon after seeding as possible.

WILKAWATT (Average annual rainfall, 16in. to 17in.).

May 13th.—Present: 11 members.

DRILLING WHEAT.—In a short paper on this subject, Mr. A. Bates suggested that a better crop might result if the wheat were drilled in rows 9in. or 10in. apart, instead of 7in. apart, as was the general practice. He suggested conducting a test by blocking every second feeder of the 7in. drill, thus sowing the grain rows 14in. apart, the usual amount of seed and super. being sown. Members generally favored the use of the 7in. drill; one or two were inclined to prefer broadcasting. All agreed that shallow sowing was best.—Mr. D. F. Bowman delivered a short address on "The Plough."

WYNARKA.

May 13th.—Present: eight members and three visitors.

"Harvesting."—This formed the title of a paper contributed by Mr. C. W. Schultz, in which it was stated that for the first few years, until the land was fairly clear of stumps, it was not wise to cut a large area for hay, as it was most important to have stubble to burn. The binder was the best means of handling that which was cut. He then discussed the relative advantages of the harvester and stripper and winnower for handling the grain crop.

BERRI, May 15th.—Mr. F. Rogers introduced a discussion on the sparrow pest. The best means of dealing with the trouble, he thought, was poisoning. Simultaneous action was desirable. It was decided to raise funds for the purpose of providing a bounty of 4d. per dozen for sparrow heads, and 2d. per dozen for their eggs.—Mr. Burnell delivered a short address on Tasmanian industry and scenery.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

May 15th.—Present: 16 members.

Co-Operation.-Mr. Edwin Ashby delivered an address dealing with the importance of co-operation amongst fruitgrowers. After referring to the market conditions that obtain at Hobart, and explaining some of the methods adopted there for the disposal of their fruit, he cited the great advance made in the handling of fruit in California. In that State, owing to the immense increase in the planting of citrus trees, the orange growers were faced with the certainty of an immense glut and ruination prices. The business men then persuaded the growers to form themselves into a co-operative organisation, with the chief objects—The production of uniform quality article, good packing and reliable brands, increased facilities for distribution and marketing of the fruit, and the finding of new markets. The result had been that the Californian fruit was marketed in the United States of America, Canada, and other countries more cheaply than any other foodstuff in the United States of America. Some idea of the magnitude of the business was given when it was understood that no fewer than 8,000 growers were in the organi-Mr. Ashby then dealt with the possible markets of the future, emphasizing the need of making markets by a business-like method of advertising, and the systematic cutivation of a taste for apples in countries where at present there was little or no demand for them. As illustrating that method of making a market, he stated that 12 years ago 3,000 cases were sent from Australasia to South America, and now the trade has grown to 60,000 cases. The opinion was quoted of Mr. Lipscombe, of Victoria, who said that the United States of America, with their 90 million people, would be the largest market for Australian fruit. China, with its teeming millions, was suggested as perhaps the greatest market of the future. Although such a large proportion of the population were too poor to become purchases, one must not forget that there were millions there possessed of ample means. The pears produced in Southern China were quite unedible, except cooked. a taste for good fruit could be cultivated there. Other markets mentioned were Russia, India, South American States, Singapore, Japan, and tropical countries generally. Apples and pears could not be successfully grown in tropical countries. and, therefore, if the taste were generated amongst the more well-to-do citizens of such countries, the possibilities of new markets in the future were almost unlimited. Mr. Ashby then referred to the methods by which some of these markets might in time be opened up, and he thought it was not fair or proper to expect the Government to do it. There was a tendency to sit still and expect the Government to do everything. He thought that a great deal of these most important works could be better accomplished by co-operative private enterprise. They must be willing to pay liberally for an efficient business manager, who would supervise all work connected with packing and marketing the fruit during the season, and would spend the other part of the year in opening up new markets in foreign countries. He pointed out that it was not sufficient to endeavor to generate in these lands a taste for apples, but there was also a need to find out the best means of packing and presenting the fruit to meet the habits and customs of these lands. In summing up, Mr. Ashby said that growers in that district must be willing to begin in a small way. Larger objectives would be possible in time. There was no reason why they should not have a co-operative packing shed, obtaining thereby a uniformly high standard of packing and grading, and in an efficient manner exploit the Australian markets, a thing that was quite impossible to individual growers.

CLARENDON (Average annual rainfall, 33.67in.).

April 25th.

SHEEP ON THE FARM.—In a paper on this subject Mr. W. B. Burpee said:—"For the Northern farmer the Merino is undoubtedly the sheep to keep, and to the man who only intends to keep sheep for the wool, then fatten them, the same applies. To the farmer, however, who goes in for breeding lambs for market, say, in a district like ours, the crossbred will give the most payable results. Many favor the Merino-Lincoln cross, and though splendid sheep, they are rather heavy for our The sheep that gave me the best returns hilly country and are enormous eaters. were the Merino-Leicester cross. My returns were as follows:-In 1912 I had 140 of these sheep, and I received for wool £43 11s. 4d. net from the brokers. I had 108 lambs, which averaged 10s. each net, equalling £97 11s. 4d. I secured 11½d. per lb. for the wool. The nearest comparison I can make with Merinos was in 1907, when I had 150 Merino ewes. I received £46 11s. for the wool (121d. per lb.), and had 120 lambs, which averaged 8s. each, equalling £94 11s. unless one has a good wire-netted fence it is better to go in for Merino ewes. I had to get rid of crossbreds because I could not keep them out of my orchard. have found it is quite impossible to fatten the lambs on the natural grass, and that it is necessary to have peas or something similar on which to top them up. grazing land will carry a breeding ewe to the acre, but the holder should be careful not to overstock."

CYGNET RIVER.

May 11th .- Present: nine members and one visitor.

LUCERNE GROWING.—In a paper on this subject, Mr. H. T. Noske said that land intended for lucerne growing should be well drained. A deep, dark sandy loam was to be preferred, and if that were dirty, it was advisable to fallow it one year before sowing. The cultivation he advised was to plough to a depth of 5in. or 6in., and break up the under layer with a subsoiling implement. From 10lbs. to 12lbs. of seed per acre should be sown in March or April. Spring sowing was very unreliable. The seed should be mixed with the manure (2cwt. of bonedust per acre) just before sowing, and 5lb or 6lb. drilled each way. Shallow sowing, followed by rolling, would insure a good germination. Pease was a good nurse crop, 15lb. per acre being quite sufficient to sow. The lucerne should be cut when one-tenth in bloom; when the binder was used it should be left lying for two or three days, and then stooked in rows not more than three sheaves wide. If grazed, the crop should be fenced off into small paddocks, and stock should not be allowed to remain more than seven days on each paddock. Lucerne that was grazed should be cultivated every second year, at least, and given a dressing of 2cwt. bonedust per acre. South Australian, Hunter River, Peruvian, and Arabian varieties had been found to do well on the island. A number of questions were put to and answered by the writer of the paper.

HARTLEY (Average annual rainfall, 15in. to 16in.).

May 17th.—Present: 17 members.

IMPLEMENTS AND MACHINERY NECESSARY ON A 500-ACRE FARM.—In a short paper under this title, Mr. F. Hassam expressed the opinion that the following plant was necessary on a holding of 500 acres:—4 or 5-furrow plough, 10-furrow skim plough, six stump-jump harrows, with strong bar and wheels, three or four horse seed drill, small winnower, with elevator attached, 6ft. binder, English wagon, tip dray, and 6ft. harvester; a winding wheat-loader was handy, and an engine, chaff-cutter, bagger, and elevator would save time. A blacksmith's shop was of importance. Whilst members generally agreed with the views expressed, some preferred a cultivator to a skim plough, and a trolly to an English wagon. The hand bag-lifter might be replaced by a horse-power lifter.

BULK HANDLING OF WHEAT.—A paper was read by Mr. B. Wundersitz.

LONGWOOD (Average annual rainfall, 37in. to 38in.)

Present: all members on roll and eight visitors.

POULTRY OBSERVATIONS.—Mr. Beythien contributed a paper, in which he dealt with various tests he had conducted in regard to poultry breeding. He had endeavored to ascertain whether broodiness was a hereditary factor, but had obtained

no definite results. He had also set out to test the idea that early moulting birds were the late autumn and winter layers. That had not proved to be so. He found that those birds went through the moult, laid a few eggs, and then went off laying until the spring, whereas the late moulters often continued to lay right through the moult, and thereafter. Continuing, the paper read:- "Broodiness is inherent in every fowl, but whether the factor remains dormant, or becomes active, simply depends upon the individual constitution of the hen. Early moulting also denotes a weak constitution, the vitality of the bird being unable to stand the strain of continuous laying into the autumn, and this weakness may have been acquired in many ways. For instance, some little setback in chickenhood, such as a chill, or a weak germ in the egg from which it was hatched, or any of a dozen other such little things may have been the cause. One also hears at times a great deal about type. Whether type influences egg production, or whether heavy egg production influences the shape of the bird, is a question that may call forth a lot of argument. sonally, I think the latter is the case. However, heavy egg producers in most cases are wedge shaped, but if a man breeds for type, and type alone, in my opinion he is building up trouble for himself. For to secure a uniform type throughout the flock he must inbreed, and inbreeding, unless handled in a very skilful manner, diminishes the vitality of the flock, and causes infertility in the hens, and has almost everything to do with heavy chicken mortality. Although inbreeding may produce some very high egg producers for a time, it also produces a big percentage of wasters. In selecting breeders on type, a man must know the flock, and the strain that is behind the flock, for, after all said and done, the strain is the most important thing of all, and unless strain is placed before type in selecting breeders, there is a good chance of losing the best laying blood. Personally, I try to select on type when I know the strain is there, but at the same time I always take the red-headed birds that lay well throughout the year and late into autumn, when I pick my breeders, whether they conform to type or not. In mating pens for breeding purposes, many persons are under the impression that by running young occkerels with old hens, or old male birds with pullets, a preponderance of cockerels or pullets will result, as the case may be. I have watched closely, and find no solid grounds for building up such ideas; but, instead, I find that this also is a matter of strain. Some strains are strong pullet producers, while others are the reverse. This is a thing worth watching, for when a man comes across a pullet-producing strain, he should stick to it.' An interesting discussion followed.

EXHIBITS.—An excellent display of apples, pears, quinces, figs, grapes, tree strawberries, and flowers then received attention. Mr. Filling delivered an interest-

ing and instructive address dealing with the qualities of several varieties.

MILANG.

May 13.—Present: 31 members.

Fencing on the Farm.—Mr. W. S. Day read a paper. After the fence line had been cleared he said, it should be sighted right through. The cheapest and best fence for that district was composed of split posts, 5ft. 9in. long by 6in. x 4in. at the smaller end; corner strainers, 8ft. 6in. in length, and not under 12in. in diameter at the smaller end; line strainers 7ft. 6in. long, and not under 10in. in diameter at smaller end. The wooden posts should be 2ft. apart, with two T iron 4ft. 6in. posts between. The strainers should be set between 15 chains and 20 chains apart, according to the nature of the ground. Six wires should be used, the top two being 12in. x 3in. barbed, and the others No. 8 galvanized. For the plain wires a §in. auger should be used, and for the second barb a lin. auger. The top wire should be fastened to the top of the posts with No. 10 galvanized wire. Line strainers should be the height of the fence, corner strainers being 3in. higher, with an outward lean of 2in. at the top. A 10ft. to 12ft. strut should be placed between the top two wires, and a good post sunk at the other end, with a slight lean backward. The top of that post should be wired to both sides of the bottom of the strainer. For running the barbed wire through the posts, it should be attached to a plain wire previously put through the holes. A horse attached to the plain wire could do the pulling, the barbed coil being unwound from the top, on the crowbar. The T posts could then be placed in position, tied to the barb by means of No. 10 galvanized wire, and the plain wires run through; the line struts should be removed before the wires were strained. Alternate wires should be tied on different sides of the strainers. For splicing, the figure 8 knot was best. In

crab-hole country, a wooden post should be placed in the hole, and a tension wire run through the top hole from the bottom of posts on the two banks. It was preferable to reconstruct portion of an old fence, rather than use good posts to "dummy" it. A double gate, in two sections, of 7ft. or 8ft., was preferable to the popular 10ft. gate. A piece of piping, placed in a block in the centre of the double gate opening, would enable one section only to be used for small teams, and both sections for the passing of wagons, reapers, &c. Yard fences should be post and rail, morticed, and with rails side lapped. An interesting and animated discussion followed.

MYPONGA.

April 27th.—Present: eight members.

INTENSE CULTURE.—A paper on this subject was contributed by the Hon. Secretary. After pointing out the necessity for experimental work, and the need for growing different crops in rotation, the paper read:--"In this district, with its 30in. rainfall, it is necessary to begin sowing early, and I advocate, for a start, a plot of rape sown on fallowed land, preferably where peas were grown the year previously, as it is possible to plough up the land after the peas have been harvested, and if the seed is sown when one might reasonably expect the early rains, more success will follow than if one waits until after the rains have set in. Rape must have a good seed bed, as the seed 's small, and must only be lightly covered. A good plan is to harrow the land, sow the seed on top, and roll it in. Given a fair season, rape will be fit to carry sheep in about eight weeks. If it is intended to cut and feed it to milking cows, it should be cut at least 12 hours before feeding, as it will taint the milk otherwise. If it is intended to be grazed with sheep, a good plan is to sow a small quantity of mustard seed with it to prevent scouring. As a milk producer, rape has few equals, and in my experience only mangolds are better. As soon as the rape is sown, it is a good plan to put in a plot of barley, Cape for preference, also on land ready prepared before the early rains start, as it will stand a fairly dry start, and the young plants require the ground as warm as possible, and not in a sopping wet and cold condition. If barley is not in early it is better left in the bags. After the rains have started, and the ground is wet enough to plough, any of the hardier varieties of green fodder, such as oats, tares, King's Early wheat, rye, and white oats can go in. The last-named I find is very hardy and well suited to this district, but is rather coarse, so should be fed down in the early stages of growth. I need not dwell on the cultivation of the different fodders mentioned, as that is too well known to need any advice; but I advocate cross drilling to get a good thick growth, and a good dressing of manure. To ensure a continuous supply of green feed all through the year, it is necessary to have a plot of lucerne, or some other fodder, such as cow grass, clover, or paspalum, to fall back on until the summer fodders are fit to utilise. I suggest sowing in early spring any of the following:—Maize, planter's friend, or Japanese millet. Of the three I prefer the planter's friend, as experience has proved beyond a doubt that it is a good milk producer, is much relished by stock, and, moreover, is very hardy. This year I have grown a good crop, despite and, moreover, is very hardy. This year I have grown a good crop, despite the fact that we have had no summer rains worth mentioning. Where practicable, a plot of lucerne is one of the best. It can be sown in autumn or To grow lucerne successfully it is necessary to have a rich, friable soil, well drained, and of good depth, and irrigation is necessary unless water is close to the surface of the soil. There are several points which must be observed. The ground must be properly prepared, the seed must be good and sown at the right time, and the young plants must have the necessary moisture at the right time. In preparing the ground the most important item is to have it worked down to a good even tilth and to an even grade, the seed must be evenly sown, and evenly covered, but only very lightly. To get the most out of this crop it is necessary to cut and hand feed it to stock. It can be grazed to advantage, but better results follow from hand feeding; but in no case must stock be allowed on it during winter months. In conclusion, I should like to impress on anyone going in for intense culture that unless they intend to do the whole thing properly and systematically, it is best left alone. On the other hand, if we follow out what experiments teach, there is a great future before the South."

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

May 1st.—Present: 12 members and three visitors.

Potato Growing.—The Hon. Secretary (Mr. G. Prentice) contributed a paper on this subject. Seed saved for planting should be the best, and free from all disease, he said. Imported seed should be carefully gone over. He preferred whole seed, about 2028. or 3028. in weight. The best way to store the small seed was to place it in thin layers, and allow one or two shoots to start from each tuber. Shooting could be encouraged by keeping the light from the potatoes. The land should be worked to a fine tilth before planting was commenced, about the end of August and extending to the first week in January. The favorite varieties of the district were Carmen, Up-to-date, White Prolific, Pinkeye, and Snowflakes. For alluvial flats that could not be irrigated, Snowflakes were preferred, planting taking place about the end of December. A good discussion followed. Messrs. Hawke, Johnston, and Little preferred large seed. Mr. Cobbledick thought it unwise to plant between the first week in November and the first week in December. Up-to-date and Carmen were the varieties most in demand. Pinkeye was preferable for early planting. Mr. Collett preferred small seed taken from a good crop. He advised Pinkeye for early planting, and Carmen and Up-to-date for late.

WOODSIDE (Average annual rainfall, 31.95in.).

June 14th.—Present: six members.

CARE AND FEEDING OF DAIRY COWS .- Mr. R. A. Keddie contributed a paper, in which he said: -- 'In a locality like the Onkaparinga the attention and care of the dairy cow, especially in the winter months, is a very important factor. are usually so severe that, unless some protection is offered, the average cow has a rather hard time. The idea of erecting a shed purely as a shlter is not, as a rule, adopted. Rugging in the winter months has, as far as theory goes, everything in its favor; but expense, no doubt, and increased labor has prevented its general adoption. Natural shelter is, I thank, the only practical method. Pine trees. planted on sections of the farm land (such as stony ridges) would soon provide an excellent shelter from the storm in winter and the sun in summer. They also add to the beauty of the paddocks, and eventually return a nice cheque when sent to the sawmill. If a cow is exposed, the supply of milk is affected seriously. The practice of putting the cows into sheltered paddocks on exceptionally severe days is a good one. Undoubtedly the most important factor towards success in the dairying enterprise is feeding. The cow has not only to supply energy for the maintenance of life, but also for the supply of milk. If the cow is fed on highly nutritious foods alone, her milk supply will diminish considerably. She must have something else which is palatable and bulky. Generally speaking, in this district a good winter fodder is what is needed. This can be supplied by growing berseem, which, I feel sure, if once given a real trial will be generally adopted. It will return from 20 tons to 30 tons per acre in a season in, say, four cuts. This speaks for itself. Barley for green feed is very popular. It should be got in as early as possible, to catch the first rains or, if possible, irrigated, for if it is not ready to cut for the cows in June it loses its value. I should suggest sowing up to 2bush, of seed to the acre. In the winter the cows need, beside these green fodders, chaff, bran, and occasionally a little pollard. The more one feeds them through the winter the better are they able to withstand the cold. In the spring the natural pastures are sufficient for their wants, but when the feed goes off there is need to again artificially feed to keep up the milk supply. There are several summer folders to choose from, but for producing a maximum of palatable bulky green stuff the maize family stands alone. They are easily grown, and easily fed, and they make the best ensilage; 20lbs. to 40lbs. to the acre is the general rate of seeding, sown late in spring to avoid the frosts. If sown at intervals of a fortnight they come on as they are wanted. Lucerne has also much in its favor, and its worth is only being realised. It can be grown profitably without irrigation in this d'strict, and will last from seven seasons to ten seasons if looked after. Where a paddock is to be left for pasture the idea of broadcasting lucerne (Hunter River) after the cereal has been put in has some merit in it. The lucerne, after the crop is cut, grows up again, and gets a good hold, offering splendid pasture for the cows. Mangolds in a food ration have proved to be the best for returning a milk supply, but they need such a lot of hand labor that they are not usually

favored. The greatest error, I fear, is the tendency to overstock the farms, for cows cannot pay if five are kept where there is room for three only. With the advancement of irrigation, and the culling of all inferior stock, the dairy industry has a bright future."

MOUNT COMPASS, May 20th.—Mr. D. J. Hutton read a paper on "House Flies," and the necessity for destroying that means of the conveyance of disease. Members were of the opinion that generally people were too ready to kill fly-eating insects.

MYPONGA, May 17th.—Mr. H. Jones gave an address on the horse in health and disease. He expressed a preference for the progeny of the Clydesdale mare and blood horse, and outlined a system of breaking colts, and explained how to tell the age of the horse.

SOUTH-EAST DISTRICT

NARACOORTE (Average annual rainfall, 22.60in.).
April 8th.

PIG-RAISING.—This subject was dealt with by Mr. W. Loller, in a paper, in the course of which he stated that if the industry were to be carried on successfully it was necessary for the pigkeeper to provide the animals with well-ventilated and warm sties. Good pure-bred pigs were preferable, and a first cross was satisfactory, provided the breeder stopped at that. He personally favored the Berkshire. and proceeded to describe the points of a pure-bred animal of that breed. Continuing, the paper read: -- "Selection is always important for breeding in domestic It is a matter of common observation that the temper and other Thus virtually quietpeculiarities of individuals are determined by inheritance. ness of disposition, mildness, or viciousness are constantly shown. the country is not filled up with superior breeds of pigs is due mainly to the want of proper care in the selection of breeding animals. The sow is capable of breedof proper care in the selection of breeding animals. The sow is capable of breeding at about seven months old, and the boar is fit for service at the age of one year. As a rule, however, the sow should not be allowed to farrow under the age of 15 months. Gestation continues about four months. Sows usually remain prolific for five or six years, and unless they get overloaded with fat, old sows are more constant and careful mothers than young ones. During gestation the sows should be kept in good heart, but not fat. They must have plenty of succulent food. Give them a little sulphur for a week or two before farrowing. When the sow is near her time her food should be of such a nature as to keep up her strength and give due sustenance to the young, but not stimulating. When the pigs are three or five days old, and danger of inflammation is past, feed liberally and with rich sloppy food, to induce a good flow of milk. Thus you may get the very best results both in the health and continued usefulness of the sow, and the constitutional growth and vigor of the young pigs. The young pig has teeth that in a short time are competent to grind and prepare food for the stomach. Wean them at six weeks old. Allow all the skimmed milk and buttermilk possible to the growing pigs, and with it, after they are two months old, a fair proportion of ground wheat skimmings or light rye, barley, &c., ground and made into a mash, to be mixed with the milk as a tolerable thin slop. Teach the pig early to eat grass, and at three months old he will take care of himself on good pasture, with all the corn he will eat at night. By this means the older stock are early freed from care of the young, and become ready for other uses. At the age of three weeks the pigs should be castrated, so that they may be well over the difficulty before weaning time. Keep rings out of the noses of young pigs. Pigs in confinement often suffer for want of water. No matter how sloppy the food, they should always have pure water within reach. If they can have a bathing place in summer it will add much to their health, and assist much in fattening. Swine in confinement should always have charcoal, salt, and wood ashes within reach. They often suffer from acidity of the stomach, and the remedy being near, they will always use it. A little cilcake mixed with the feed of the sow when suckling assists the milk secretion. See

that you waste no food by putting half of it over the pig or outside of the trough. Also see that the trough is clean. The best food to make bacon or pork firm, sweet, and of good color is skimmed milk and crushed wheat. This is No. 1 food for topping up with. No. 2 is milk and barley; No. 3, milk, rye, and maize; No. 4, milk and peas. Peas darken the bacon. They can be given the pigs between This keeps them contented and from getting too hungry. Three meals per day is better than two for hogs that are confined in a stye, for that reason. finely crushed corn has proved more satisfactory than boiled or soaked. The only whole corn that I can recommend is oats for working boars. There are several things that I have not touched, as to 'How to make hog-raising profitable?' There show you how to make them pay just now, but let us all take up pigbreeding, and where would we be? I am afraid on the wrong side of the ledger. To prevent this glutting we must find an outside market. It is the only remedy. I happened to take charge of a large piggery in 1889 up to 1908. We kept up to 1,000 pigs, so I had the opportunity of studying the hog and its market for 19 years, and I found that there was no market that fluctuated so much and so quickly as the pig market, just for the want of an outlet to take off the surplus. Then, again, if we take up this export business we must keep it going. I think that there should be a great outlet for our bacon, hams, &c., and also fresh pork. We have the country and the means, I think, to take up this large industry." In reply to questions, the writer of the paper said that in order to prevent sows eating their young, they should not give breeding sows too much raw food, and they should not give them raw flesh. They should carefully watch the sow when it first gave birth to its young, and see that it had good food. Mr. Hart said that in order to make pigraising pay they should have them fit for market at four months of age, and they should weigh from 70lbs. to 100lbs. Sows eating their young was a nervous complaint, and if the pig was not well at farrowing there was a liability of it eating the young. The chairman said it was bad policy to give a pig too much food at once, and allow it to become stagnant in the trough. Crushed corn was better than whole corn. Mr. Loller replied at some length to criticisms. They required to feed the pig to get a good color to the bacon, and he placed crushed wheat first. Barley was good, but not so good as wheat. Topping up with crushed wheat gave a nice clean, sweet bacon. When they took a sucker from its mother they did not proceed at once to fatten him. They wanted him to get size before fattening, and there was plenty of cheap feed, such as good pasture, which would keep him in good condition while growing. When he got size they could then proceed to top him up in a month. The speaker explained at some length the various classes of pigs marketed, such as porkers, choppers, and baconers. He was against crossing, as it only tended to encourage a lot of mongrels. From his experience there was no pig that gave better returns in flesh per lb. for the food consumed than the Berkshire, and he had had experience with most of the breeds. They heard a great deal about the Tamworth, but there was not much profit in it when the cost of its feed was calculated. He would not say it did not make a good cross, but the tendency of the cross was to get into a bad mongrel breed.

NARACOORTE (Average annual rainfall, 22.60in.). May 13th.—Present: 19 members.

STOCK AND CEREAL RAISING.—In a paper under this heading, Mr. S. Hart said the successful farmer must combine the growing of wheat and other cereals with the keeping of livestock, as such crops as oats, barley, and peas, and so forth, could be fed to livestock and made walk to market, and in that way return a much better price than if sold by the bushel. Animals were very important factors in soil-making. Every animal was continually fertilising the land. With the exception of South America and portion of South Africa, in all countries the livestock, if not decreasing, was not increasing at the same rate as the population, and most countries did not produce enough for their own consumption. So Australia's importance in the meat supply of the world might be seen. Cold storage enables Australia to put meat on the European market in perfect condition. In a district like Naracoorte, land would carry far more stock per unit of area whilst under cultivation than was possible under original pastoral conditions. They had a much better rainfall than many parts of the State, abundance of water at very shallow depths,

procurable by boring, and the mild climate enabled farmers to do much in the way of growing forage crops. The conditions under closer settlement were altogether different from those on large station properties, and so the system of management must be different. The squatter depended on acres for feed; the farmer must depend on forage crops. With wheat, the area under crop could be very much increased any year to meet a demand, but with livestock the increase must necessarily be much slower. Farmers should get the best female stock that they could afford, and mate them with pure-bred sires. The man that started with a good line of ewes, or a good cow, or a good mare, or sow, and did not occasionally breed something better, was not a successful breeder. If young stock were allowed to stop growing, they were very unlikely to make tip-top animals, neither would they, if used for breeding purposes later on, be likely to maintain the standard of the herd, much less improve it. If at any time, through shortage of feed, any animals had to be kept on short rations, it should be the adult, never the youngsters. There was more profit in one good colt, well reared, than in half a dozen medium ones underfed. The good draught mare was the cheapest power on the farm. Two cows often paid where 12 would not, and the same applied to all animals. It was always desirable, if possible, to have all young stock (excepting pigs) born when green feed was available. Green feed was better than medicine for getting rid of worms and other parasites. In bare open paddocks shelter from cold winds, such as a good stack of straw or other cheap wooden shelter, should be provided. Summing up, after stating that the demand for meat was likely to continue, the paper read:-"Much of our hay and grain can be marketed more easily and profitably in that form. Animals improve the soil by their droppings. By growing forage crops, leguminous and others, we are continually increasing the production of wheat in its turn, and also by the keeping of livestock and growing a variety of crops the work on the farm is distributed more over the year, whereas by just growing grain it is a rush at seeding and harvest, with a consequent shortage of labor in the busy time, and unemployment for the laborer during the slack periods. If a man has not a natural love for animals, he should leave them alone. I ask it for the sake of the animals, not the man's sake; let him stick to grain-it has no feelings. Grow wheat, by all means, but as one of a rotation of crops. The same with other cereals. Sell when the market is good; at other times feed to livestock to a great extent. We should remember that the bone and muscle of our colts, the meat and wool of our cattle and sheep, are all produced in a factorythat factory is the stomach of the animals, and it is our business to provide the raw material, in the shape of feed of good quality, and the supply must be sufficient to keep every factory working day and night if we want the best possible output of marketable material."

KALANGADOO, June 10.—An interesting discussion took place on the subject of footrot in sheep.

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